

## RECORDS CODE SHEET

DND 4535 (Rev. 1-65)

## NAVAL AVIATION SAFETY CENTER

GENERAL (Card No. 1)

SUPPLEMENTARY (Card No. 2)

Bureau Number	152437	16-21	Weather		16-21
Reporting Custodian	F54	22-24	Kind of Flight	1A1	22-24
Type Day	T	25	Relative Wind - Direction	N	25
Major Command	3	26	Relative Wind - Velocity	2	26
Aircraft Damage	A	27	Special Attention		27
Aircraft Injury	A	28	Clearance	2	28
Time of Day	2	29	Maneuver prior to Occurrence		29
Carrier Hull Number	-	30	Number of Other Aircraft		30
First Accident type	A6	31-32	Primary Causal Factor		31-32
First Accident phase	48	33-35	Altitude of Occurrence of Emergency	055	33-35
Second Accident type		36-37			
Second Accident phase		38-40	Environmental Factors	7F	38-40
Type of Operation	3	41-42			
Contributing Cause Factors	Z	43-47	Non-Navy Injury ("R")		42
Pilot Factor, First		48-49	Number of "A" or "U" Injury	04	43-44
Pilot Factor, Second		50-51	Number of "B" Injury		45-47
Pilot Factor, Third		52-53	Number of "C" Injury		48-49
First other Personnel Factor		54-55	Number of "D" Injury		50-51
Second other Personnel Factor	1	56-57	Number of "E" Injury		52-53
Primary Major Material Factor		58	Number of "F" Injury		54-55
Secondary Major Material Factor		59	Number of "G" Injury		56-57
Design		60	Location	ASELTRO	62-68
Facilities		61			
Special Data & Cond.	BDGM	62-65			
Special Data & Cond./Type of Incident		66			
Primary Cause	Z	67	ACCIDENT DAMAGE		
1st Poss. of Pri. Causal Factor		68	ACCIDENT INJURY		
1st Possible Cause & Causal Factor	30	69-71	FISCAL YEAR	7	
2nd Possible Cause & Causal Factor	153	72-74			
No Personnel Card ("R")		80			

Don't Count	Enemy Action	Other Aircraft
L D	7 04 14 14	
NO.	YR	MO
	DAY	TYR
	11	12
	13	14
	15	Model

Model Code

5A

## PERSONNEL STATISTICS

(Card No. 3)

File Number	(b) (6)	Rank Rate	Br Service	Age	Yrs Experience	Status	Position	In to Ind	Abandon A/C	Pilot Factor Involved	Trainer Utilization	Instr. Card	Total Time All Models	All models 3 months	All Series This Model	All Ser Mod 3 months	CV Landings	Instrument Hours	Min Hours	Total Time Jet or Helo
03	GREENLEE	55	58	AH1	A12	A12	258	1799	118	11	1499									
04	FUNCHEN	E66	1	0E2	A14	A12	306	0906	0906	0906	0906									

Name 16 17 18 19 20 21

Name 16 17 18 19 20 21

File Number (b) (6)

IBM: PERSONNEL CODED ON REVERSE SIDE

9 OCT 1966

CLOSED

CODED JPC REVIEWED LOGGED BB PUNCHED VERIFIED

07 JUL 1967

CODE SHEET REVIEWED BY CLASS DESK ANALYST

(Initials)

(Date)

## OTHER INJURED PERSONNEL

(Modified Card No. 3)

[illegible]

IBM Place an  
"X" overpunch  
in CC80 if these  
cards are coded.



GREENLEESE

SER 227

I.D. Number	GCI	MODEL	FX	Model Code
70414104	00	VHIE	7	80

TT	Equipment								Equipment								Equipment								Equipment								Equipment								Equipment								IN	No	C	Seq								
AM	Equipment								Equipment								Equipment								Equipment								Equipment								Equipment								Equipment								J	of	Z	of
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	
	D	F	Z	0	5	3	A	I	2						G	7					N	I					S	I					P	8					E	2					A	0			A	1	2		0	1						

CARD 65

CARD 65																																																												I	No.	C	Seq.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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CARD 65A

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CARD 65B

TYPE		TYPE	TOP	EST.	EGRESS	EGRESS	EGRESS	TYPE	F	SEAT	EJTT.	AIR-	WEIGHT	CHUTE	INCRASH	Time	Time	25 SEP 196		V	F	EST.	I	C	Seq
CRASH	SHAPE	AT	SCANS	INFO	Prob.	Prob.	Prob.	SECT	IR-26	POS	ALT.	SPEED		O.P.	AREA	IN	IN		FR	RACTURES	FAT.	INJURY	OMB	ATT	NO
TYPE	TYPE	TOP	EST.	EGRESS	Prob.	Prob.	Prob.	SECT	IR-26	POS	ALT.	SPEED	WEIGHT	CHUTE	INCRASH	Time	Time		FR	RACTURES	FAT.	INJURY	OMB	ATT	NO
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
DF	FZ																								

CARD 66

GREENLEESE SER. 227

I. D. Number	GCI	MODEL	FY	MODEL CODE
76414104	88	UH1E	7	80

TYPE A/C	WIND VEL	WAVE HEIGHT	VISIBILITY	AIR TEMP	WATER TEMP	ALERT FACTOR	LOC. SITE	LOC. SURV.	SURV. FAC.	FATALS (NO RESCUE)	TRG. DATE	TRG. DATE	TRG. FACTOR	ONE PR	SEQ OF IND.
DF10			3.64			B	N	JIA	GGPG					2A	81

CARD 67

TIME MIS HAPP	LOC. SEPARATE	LOC. DUTY RES. VEH.	RESCUE VEHICLE MODEL AND TYPE	NO TO BE RESCUED	NO RESCUED	BACK UP RES. VEH.	WATER TEMP	AIR TEMP	SEA COND	WEATHER WIND VEL	RESCUE EQUIPMENT USED	TRG. OF RES. TEAMS	COM. TECH AND EQUIP	RETRV TECH AND EQUIP	RES TEAM WORK	TYPE AIRCRAFT	TYPE MIS HAPP	TOPOGRAPHY	DISTANCE	TIME MIS TO ALERT	ALERT PROB.	METHOD OF ALERT	TIME DEPART	DEP Delay	INJURY	SEQ OF IND.
617181920212223242526272829303132333435363738394041424344454647484950515253545556575859606162636465666768697071727374																										

CARD 68

TIME ALERT TO LOC.	PROB IN RIE.	FAIL TO REACH	REASON	TIME LOC TO RCH.	LOCATOR MEANS	LOC PROB	SURV. SIG. PROB.	TYPE A/C	RESCUE PROBLEMS	RESCUE PROBLEMS	RESCUE PROBLEMS	RESCUE PROBLEMS	SURVIVOR PROBLEMS	SURV. COND	SURV. COND	TIME RCH. TO ACC.	TOT. TIME	RES REC.	SEQ OF IND
1617181920212223242526272829303132333435363738394041424344454647484950515253545556575859606162636465666768697071727374																			

CARD 69



FUNCHEON SER. 227

I.D. Number	GCI	MODEL	FY	Model Code
70414.104	00	VH1E	7	80

[illegible]

CARD 65

[illegible]

CARD 65A

CARD 65 A																																																																										IN		No. of		C Seg						
T		M		J		C		S		D		E		F		G		H		I		J		K		L		M		N		O		P		Q		R		S		T		U		V		W		X		Y		Z		Total																												
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

CARD 65B

[illegible]

CARD 66

FUNCHION SER. 227

I.D. Number	GCI	MODEL	FY	MODEL CODE
70414104	00	VH1E	7	8A

TYPE		WIND	WAVE	VIS	AIR	WATER	ALERT		LOC.	SURV	FATALS	TRG.			NO		INJURY		CLONE		SEQ																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
TYPE	TYPE	VEL	HEIGHT	INTE	TEMP	TEMP	FACTOR	ST	SURV.	FAC.	(NO	DATE	DATE	FACTOR	DATE	DATE	DATE	DATE	DATE	DATE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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CARD 67

TIME OF DAY				LOC. DUTY RES. YEH.	RESCUE VEHICLE MODEL AND TYPE	NO TO BE RESCUED	NO RESCUED	BACK UP RES. VEH.	WATER AIR SEA TEMP	WIND DIR VEL	WEATHER	RESCUE EQUIPMENT USED	TAG OF RES. TEAM	COM TECH AND EQUIP	RETRV TECH AND EQUIP	RES TEAM WORK	TYPE OF HAZARD	TOPOGRAPHY	DISTANCE	TIME MIS TO ALERT	ALERT PROB.	METHOD OF ALERT	PROPERTY	INJURY	CNS OF EIND																																	
DATE	TIME	DAY	MONTH																																																							
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74

CARD 68

TIME ALERT	PROB IN LOC.	REASON TO RASH	TIME LOC TO RCH.	LOCATOR MEANS	LOC PROB	SURV. SIG. PROB.	TYPE A M I S	TYPE E M I S	RESCUE PROBLEMS	RESCUE PROBLEMS	RESCUE PROBLEMS	RESCUE PROBLEMS	SURVIVOR PROBLEMS	SURV. COND	SURV. COND	TIME RCH. TO ACC.	TOT. TIME	PES REC.	SEQ OF IND																																							
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74

CARD 69

PLUM SEA 227

I.D. Number	GCI	MODEL	FY	Model Code
70414104	80	VH1E	7	80

[illegible]

CARD 65

[illegible]

CARD 65A

T A M		I N J		No. of Cds		C Seg of Ind																																																				
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74

CARD 65B

[illegible]

CARD 66



PLUM SER. 227.

I. D. Number	GCI	MODEL	FY	MODEL CODE
70414104	AA	VH1E	7	80

[illegible]

CARD 67

TIME OF DAY		LOC.	DUTY RES. VEH.	RESCUE VEHICLE MODEL AND TYPE	NO TO BE RESCUED	BACK UP RES. VEH.	WATER TEMP	AIR TEMP	SEA COND	WEATHER	WIND VEL	RESCUE EQUIPMENT USED	TRG. OF RES. TEAMS	COM. TECH AND EQUIP	RETRV TECH AND EQUIP	RES TEAM WORK	TYPE MISHAP	TOPOGRAPHY	DISTANCE	TIME MIS. TO ALERT	ALERT PROB.	METHOD OF ALERT	TIME DEPART	DEP Delay	INJURY	C NOSE	SEQ OF FIND																																									
M	SHAP																																																																			
6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74

CARD 68

TIME ALERT TO LOG.	PROB IN RTE.	FAIL TO REASON	TIME LOC TO REH.	LOCATOR MEANS	LOC PROB	SURV. SIG. PROB.	TYPE E A/ M/ C	TYPE E A/ M/ C	RESCUE PROBLEMS	RESCUE PROBLEMS	RESCUE PROBLEMS	RESCUE PROBLEMS	SURVIVOR PROBLEMS	SURV. COND	SURV. COND	TIME REH. TO ACC.	TOT. TIME	RES REC.	SEQ OF IND																																							
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74

CARD 69

MILLANE SER. 227

I.D. Number	GCI	MODEL	FY	Modl Code
70414104	00	VH1E	7	80

T A	M	Equipment	Equipment	Equipment	Equipment	Equipment	Equipment	Equipment	Equipment	I N J	No. of Cds.	C Z	Ses of Invd.																																													
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
D	F	Z	G	S	A	A	I	2						G	7				N	1					E	3					S	1			A	G					E	H	C					A	1			O	K					

CARD 65

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CARD 65A

T A M		I N J		No. of Cds		C F		Seg and Ind																																																		
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74

CARD 65B

[illegible]

CARD 66

MILLANE SER. 227

I. D. Number	GCI	MODEL	FY	MODEL CODE
78414184	88	UH1E	7	88

TYPE A/C	WIND VEL	WAVE HEIGHT	VISIBILITY	AIR TEMP	WATER TEMP	ALERT FACTOR	LOC. SURV.	SURV. FAC.	FATALS (NO RESCUE)	TRG. DATE	TRG. DATE	TRG. FACTOR	UN DER R	IN JURY	SEQ OF IND
DF10	364					B	N	JIA		PPPP			2A	44	

CARD 67

TIME OF DAY	MISSION DATE	LOC. DUTY RES. VEH.	RESCUE VEHICLE MODEL AND TYPE	NO TO BE RESCUED	NO RESCUED BACK UP RES. VEH.	WATER TEMP	AIR TEMP	SEA COND	WEATHER WIND VEL	RESCUE EQUIPMENT USED	TRG. OF RES. TEAMS	COM. TECH AND EQUIP	RETRV TECH AND EQUIP	RES TEAM WORK	TYPE AIRCRAFT	TYPE MISSION	TOPOGRAPHY	DISTANCE	TIME MIS. TO ALERT	ALERT PROB.	METHOD OF ALERT	TIME DEPART	DEP DELAY	IN JURY	SEQ OF IND

CARD 68

TIME ALERT TO LOC.	PROB IN RTE.	FAIL TO REACH	REASON	TIME LOC TO RCH.	LOCATOR MEANS	LOC PROB	SURV. SIG. PROB.	TYPE A/C	RESCUE PROBLEMS	RESCUE PROBLEMS	RESCUE PROBLEMS	RESCUE PROBLEMS	SURVIVOR PROBLEMS	SURV. COND	SURV. COND	TIME REM. TO ACC.	TOT. TIME	RES REC.	SEQ OF IND

CARD 69



# REQUEST FOR CODE SHEET CHANGES

From: MEM Dept. Ch. chg. in

To: (1) Coder Ch. chg. in  
 (2) M&M 47-4157  
 (3) Log Clerk BB725  
 (4) IBM JP  
 (5) File Clerk JUL 1967

20 July 67  
 (Date)

Return to: Open File           
 Closed File           
 Master Coder           
 Other         

Ident. No. 70414104 Model 1441E BUNO 152437 Model Code 80

Card #1 - Chg. col.          to          Chg. col.          to           
 " "          to          " "          to           
 " "          to          " "          to           
 " "          to          " "          to         

Card #2 - Chg. col.          to          Chg. col.          to           
 " "          to          " "          to           
 " "          to          " "          to         

Card #          Name          Chg. col.          to           
 " "          to           
 " "          to           
 " "          to         

Card #          Name          Chg. col.          to           
 " "          to           
 " "          to           
 " "          to         

USE THIS SECTION FOR CHANGES TO CARDS 31 THROUGH 59 AND CARDS 20 THROUGH 29.

Card # 35 Chg. col. 65 to 2 Card #          Chg. col.          to           
 " " 35 " " 58-64 to 1E49582 " "          " "          to           
 " " 33 " " 52-54 to C10 " "          " "          to           
 " Re-write Mem " Narrative " "          " "          to           
 " "          " "          to         

☒ Card #(s) 36 IBM, SEE CHANGES TO NARRATIVE BRIEF.  
 ORIGINATOR, USE REVERSE SIDE FOR CHANGES TO BRIEF.

NOTE: (1) A separate change sheet will be used for each A/C involved.  
 (2) Change sheet will be stapled to code sheet.

(b) (6)

Originator's Signature

☐ Change to 5 x 8 card required.

# MAINTENANCE AND MATERIAL CODE SHEET (Narrative brief on reverse)

SND 4621 (Rev. 11/65)

MAINTENANCE AND MATERIAL CARD NUMBER 33										CARD COL.
PRIMARY INVOLVED MATERIAL COMPONENT										16-21
SECONDARY INVOLVED MATERIAL COMPONENT										24-29
POSSIBLE INVOLVED MATERIAL COMPONENT										32-37
SPECIAL DATA AND CONDITIONS										40-42
SPECIAL DATA AND CONDITIONS										44-46
SPECIAL DATA AND CONDITIONS										48-50
SPECIAL DATA AND CONDITIONS										52-54
SPECIAL DATA AND CONDITIONS										56-58
SPECIAL DATA AND CONDITIONS										61-63
FIRST MAINT FLT SPEC COMPONENT										65-68
CARD NUMBER										79-80

MAINTENANCE AND MATERIAL CARD NUMBER 35										CARD COL.
POSSIBLE OR SECONDARY INVOLVED MATERIAL COMPONENT:										
MFG P/N										16-31
TOTAL HOURS										34-37
OVERHAUL ACTIVITY										39
NUMBER OF OVERHAULS										41
HOURS SINCE OVERHAUL										43-46
POWER PLANT MODEL NUMBER										49-56
POWER PLANT SERIAL NUMBER										58-64
DIR										68
CARD NUMBER										79-80

COORDINATOR			
DIVISION OFFICER			
DATE CODED			
CODED BY			
LOGGED			

M&M CODING RECORD

PUNCHED		VERIFIED	
PUNCHED		VERIFIED	

FOR IBM

MAINTENANCE AND MATERIAL CARD NUMBER 34										CARD COL.
PRIMARY INVOLVED MATERIAL COMPONENT:										
MFG P/N										16-31
TOTAL HOURS										34-37
OVERHAUL ACTIVITY										39
NUMBER OF OVERHAULS										41
HOURS SINCE OVERHAUL										43-46
AIRCRAFT TOUR										48
AIRCRAFT FLIGHT HOURS SINCE ACCEPTANCE										50
AIRCRAFT FLIGHT HOURS SINCE LAST INSPECTION										53-55
DAYS SINCE LAST AIRCRAFT INSPECTION										57-58
TYPE LAST AIRCRAFT INSPECTION										61
MONTHS SINCE PAR/OVERHAUL										63-68
CARD NUMBER										79-80

CAUSE FACTORS

COMPONENT NO. 1

COMPONENT NO. 2

DESIGN

POSSIBLE CAUSE FACTORS

COMPONENT

DESIGN

ACCIDENT DAMAGE		ACCIDENT INJURY	
I.D. NO.		I.D. NO.	
YR		YR	
MO		MO	
DAY		DAY	
TYP		TYP	
SEQ		SEQ	
Model		Model	
SPECIAL ATTN: ("X")		SPECIAL ATTN: ("X")	
Model Code		Model Code	

07 JUL 1967

MODEL		BUNO		DATE		IDENT. NUMBER	
-------	--	------	--	------	--	---------------	--

REPORT NUMBER

CUSTODIAN

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68

AIRCRAFT WAS ON A  
 SCHEDULED PILOT FLIGHT CHECK FROM ACALT PENDLETON. AN  
 INCOMPLETE MAYDAY CALL WAS RECEIVED BY EL TORO TOWER  
 WITH AIRCRAFT REPORTING 14 MILES SOUTH OF - END OF MAY  
 DAY. WRECKAGE OF AIRCRAFT WAS FOUND ON MOUNTAIN SLOPE  
 CAUSE OF ACCIDENT IS UNDETERMINED. INVESTIGATION OF  
 THE ACCIDENT REVEALED A BOLT & NUT MISSING FROM THE  
 TAIL ROTOR CROSSHEAD SLIDER. LOSS OF BOLT & NUT WOULD  
 INDUCE A HIGH FREQ VIB WITH REDUCED CONTROL OF THE  
 TAIL ROTOR SYSTEM. EXTENSIVE IMPACT DAMAGE PRECLUDES  
 POSITIVE INFLIGHT FAILURE/MAJ FUNCTION. THE MOST PROB  
 ABLE CAUSE OF THIS ACCIDENT IS THE IMPROPER SECURING  
 OF A SELF-LOCKING NUT IN THE TAIL ROTOR CONTROL SYS.  
 POSSIBLE CAUSE FOR NUT TO BACK OFF WOULD BE INAPPROPER  
 TORQUING PROCEDURE OR LOSS OF LOCKING FEATURE DUE TO  
 REUSE OF A SELF-LOCKING NUT IN A CRITICAL AREA. IT IS  
 RECOMMENDED THAT SELF-LOCKING NUTS BE REPLACED IN ALL  
 CRITICAL AREAS WITH MS-1235 NUTS. FLIGHT PLAN SOP WAS  
 VIOLATED. NATOPS PROCEDURES WAS AT TIMES IGNORED BY  
 PILOT WHEN ATTEMPT TO AUTO-ROTATE AIRCRAFT. RECOMMEND  
 THAT PILOTS COMPLY AND ADHERE TO ESTABLISHED FLIGHT  
 PROCEDURES AND NATOPS MANUAL.

CARD NO.

79 80  
 3 6  
 3 7  
 3 8  
 3 9  
 4 0  
 4 1  
 4 2  
 4 3  
 4 4  
 4 5  
 4 6  
 4 7  
 4 8  
 4 9  
 5 0  
 5 1  
 5 2  
 5 3  
 5 4  
 5 5  
 5 6  
 5 7  
 5 8  
 5 9

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68

79 80



DISPATCH CARD  
A/C ACCIDENTS ONLY  
(REV 4-65).

CODED EL DATE 4-12  
LOGGED BB DATE 4-14  
PUNCHED 8 P DATE 20 APR 1967

SUBJECT	DON'T COUNT	ENEMY ACTION	OTHER AIRCRAFT	CARD COLUMNS
IDENTIFICATION	7	0	4	1-8
ACCIDENT DAMAGE		1		9
ACCIDENT INJURY				10
MODEL AIRCRAFT			1	11-13
BUREAU NUMBER			1	16-21
REPORTING CUSTODIAN			5	22-24
TYPE DUTY				25
MAJOR COMMAND				26
AIRCRAFT DAMAGE				27
AIRCRAFT INJURY				28
TIME OF DAY				29
CARRIER HULL NO.				30
FIRST ACCIDENT TYPE				31-32
FIRST PHASE OF OPERATION				33-35
TYPE OF OPERATION				41-42
CONTRIBUTING CAUSE FACTORS				43-44
NUMBER "A" OR "L" OR "U" INJURIES				48-49
SPECIAL DATA AND CONDITIONS				62-65
PRIMARY CAUSE				67
DISPATCH CARD				74
FISCAL YEAR				75
MODEL CODE				76-77

IBM NOTE: Key punch a "12" overpunch in card column 8 to denote other aircraft.

NAVAL AVIATION SAFETY CENTER  
NAVAL AIR STATION  
NORFOLK, VIRGINIA 23511

16/ras  
Ser 1424  
9 OCT 1967

SPECIAL HANDLING REQUIRED IAW OPNAVINST 3750.6 SERIES  
FOR OFFICIAL USE ONLY

From: Commander, Naval Aviation Safety Center  
To: Commanding Officer, Marine Observation Squadron FIVE  
Subj: VMO-5 AAR ser 1-67A concerning UH-1E BuNo 152437 accident  
occurring 14 April 1967, pilot GREENLEESE

1. The subject report and all endorsements thereon have been reviewed. Commander, Naval Aviation Safety Center concurs with the comments and recommendations of the Aircraft Accident Board as modified by subsequent endorsers.

2. The cause of this accident has been recorded at the NAVAVNSAFECEN as follows:

a. PRIMARY FACTOR: UNDETERMINED.

b. POSSIBLE CONTRIBUTING FACTORS:

- (1) MATERIAL (tail rotor failure).
- (2) OTHER PERSONNEL (maintenance).
- (3) PILOT (mental condition--tension).
- (4) WEATHER

(b) (6)

By direction

Copy to:  
CMC (Code AAP)  
NAVAIRSYSCOMHQ (AIR 404) (2)  
COMNAVAIRPAC  
CGFMFPAC  
CGTHIRDMAN  
CO MHTG-30  
USAAVCOMREP BELL PLANT FT WORTH

FOR OFFICIAL USE ONLY



NAVAL AVIATION SAFETY CENTER  
NAVAL AIR STATION  
NORFOLK, VIRGINIA 23511

Code 61/Pn  
15 May 1967

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6E

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NAVAVNSAFECEN INVESTIGATION 58-67

Ref: (a) ARADMAC Corpus Christi msg 042040Z May 1967  
(b) NAVAIRSYSCOMHQ msg 182135Z May 1967

1. INTRODUCTION

a. The Accident. UH-1E, BUNO 152437, assigned to MARINE OBSERVATION SQUADRON FIVE (VMO-5) crashed 1000 meters south of Santiago Peak (elevation 5696 ft) and west of Holy Jim Canyon, California, at 1245(U) on 14 April 1967. The aircraft was destroyed (ALFA) upon impact and the four occupants were fatally injured.

b. Synopsis of Flight. The flight departed from Camp Pendleton at 1030(U), 14 April, on a pilot qualified in model (PQM) flight check with a planned stop at Point Vicente Coast Guard Station. The flight departed Point Vicente at 1219(U) on a VFR flight plan to Camp Pendleton with an enroute delay in local area. The last positive radar check was at 1226(U) over Huntington Beach. An incomplete MAYDAY transmission was heard nineteen minutes later at 1245(U). Poor weather conditions and the mountainous terrain hindered the extensive search efforts to locate the aircraft. The aircraft was finally located two days after the distress call.

2. INVESTIGATION AND ANALYSIS

a. History

(1) Pilot. 1/LT William E. GREENLEESE, USMC, (b)(6) was the instructor pilot and was riding in the left seat. He had been designated a Naval Aviator for twelve years and had accumulated 5800 flight hours of which 4327 hours were in helicopters. He had a total of 1024 hours in the UH-1E and had been a flight instructor for two years in the Camp Pendleton area. The ability of the pilot was considered to be outstanding. He always demanded a high degree of performance from students.

(2) Copilot. 2/LT Edward J. FUNCHOON, USMCR, (b)(6) was the student pilot and flying the aircraft in the right seat. He had been

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Enclosure (1)



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NAVAVNSAFECEN INVESTIGATION 58-67

designated a Naval Aviator five months and had accumulated 337 flight hours of which 172 hours were in helicopters. He had a total of 97 hours in the UH-1E and this was to be his final check flight in the aircraft. He was an average aviator who at times appeared blasé in his attitude toward flying.

(3) Observer. CAPT Harold E. PLUM, USMC, (b) (6) was a newly assigned flight instructor to the squadron. He was aboard the aircraft as an observer for flight requirements for the PQM flight check.

(4) Crewmember. Richard Daniel MILLANES, CPL, USMC, (b) (6) was a qualified crewmember assigned for the flight.

(5) Aircraft. UH-1E BUNO 151885 had operated 537 hours since acceptance by the Navy on 6 July 1966. A second ODD calendar periodic inspection was performed twenty-four days prior to the accident. The aircraft had operated sixty-six hours since check.

(6) Engine. T53-L-11 engine, serial number LE-09582, was accepted by the Navy on 1 July 1964 and had operated 967 hours since new. The engine had operated 523 hours since overhaul at ARADMAC, Corpus Christi, on 29 April 1966. A fifty-hour inspection of the engine was completed on 12 April 1966.

(7) Weather. The reported weather at MCAS El Toro at the time of the crash was 2000 feet broken. The weather in the vicinity of Santiago Peak was overcast with the bases about 4000 feet and the tops at 5000 feet. There were no cumulus buildups in the area.

b. Field Investigation

(1) A distress call was received by San Clemente, Los Alamitos, and El Toro on 340.2 m.c. This incomplete report - "MAYDAY, MAYDAY, MAYDAY, Uniform Victor One Three, One Four miles south . . ." gave no clue as to the nature of the problem. The report was received on Button One which is not the normal channel used in the local area. It is felt that one of the pilots attempted to switch to GUARD frequency.

(2) The extremities of the aircraft and control system were in the immediate area of the wreckage. There were two ground scars where the main rotor blades initially impacted. It appeared that the white blade was the point of initial impact followed by the red blade and then the nose

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NAVAVNSAFECEN INVESTIGATION 58-67

section of the helicopter. The tail section broke loose at impact and came to rest upside down. The wreckage distribution gave conflicting evidence of impact attitude.

(3) The aircraft appeared to have impacted the thirty-degree slope in about a forty-degree nose down attitude with about sixty degrees of left bank. Severe fire damage resulted after the impact. The wreckage was not widely distributed indicating a low horizontal speed at the time of impact.

(4) All wreckage except the molten fragments was removed from the crash site by helicopter. An attempt to reconstruct the aircraft was made in order to determine if an inflight fire, blade interference, or structural failure occurred before the initial impact. There was evidence that the white tail rotor blade struck the pylon. The point in time of this strike could not be determined. There was no evidence of an inflight fire or a structural failure.

(5) There were numerous sheared and broken components in the flight control system. These components were shipped to ARADMAC, Corpus Christi, for disassembly.

(6) Maintenance records revealed that work was performed on the main rotor hub on 28 March, the stabilizer bar on 20 March, and the tail rotor hub on 25 January. There were two yellow sheet control gripes about thirty flight hours prior to the accident. The gripes complained of a lateral and a vertical beat. The friction collective was retorqued. No association between the pilot yellow sheet comments and the accident were uncovered.

(7) There were four tools found in the wreckage. These were all located in one small area and are normally carried by the crewmembers.

(8) Interviews with the Commanding Officer, instructors, and the check pilot's personal friends indicated that the pilot would not fly instruments on a VFR flight plan or fly under the overcast in marginal weather conditions in mountainous terrain. It was the pilot's normal procedure to use the higher rough area landing (RAL) sites around Santiago Peak.

c. Disassembly Inspection. Reference (a) is a message report of the disassembly performed at ARADMAC, Corpus Christi. Pertinent data is extracted as follows:

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NAVAVNSAFECEN INVESTIGATION 58-67

(1) The engine was operating at impact. The linear actuator disclosed the engine was beeping up to 6575 turns.

(2) The tail rotor blades struck the pylon and tail rotor drive shaft between the 42-degree and 90-degree gear boxes. The tail rotor hub pounded the static stops causing the tail rotor hub nut threads to fail in shear.

(3) One bolt, P/N AN174-15A, and self-locking nut, P/N NAS679-A4, was missing from the crosshead assembly, P/N 204-011-711-1. The physical evidence showed that the nut had backed off and the bolt came out prior to impact.

d. Probable Sequence of Events. The pilot was attempting to locate a clear area to approach the high landing sites in the vicinity of Santiago Peak. At this time the self-locking nut in the crosshead/slide assembly began to loosen, thus causing an out-of-track and out-of-phase situation in the pitch control mechanism of the tail rotor. The pilot slowed the helicopter and attempted an approach through the overcast to an emergency landing. While in a descending left turn the nut backed off causing erratic lateral oscillations and severe vibrations. A MAYDAY report was initiated at this time by the copilot. The aircraft impacted with the mountain slope completely out of control, or with insufficient tail rotor control to avoid the collision.

3. CONCLUSION. The most probable cause of this accident is the improper securing of a self-locking nut in the tail rotor control system. The possible causes for the nut to back off would be improper torquing procedure or loss of locking feature due to re-use of a self-locking nut in a critical area.

4. ACTION COMPLETED

a. The NAVAIRSYSCOMHQ in reference (b) published Interim Airframe Bulletin No. 30. This bulletin provided for a one-time inspection of the retaining nuts for proper self-locking capability. In addition, all future maintenance requiring the removal of the nut will require the use of a new nut upon reassembly of the tail rotor crosshead and slide assemblies.

b. The NAVAIRSAFECEN has initiated action to replace the self-locking nut with a self-locking castellated nut and a cotter pin.

c. The Safety Education Department has published an article in the Weekly Summary relating to the proper use of self-locking nuts.

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NAVAVNSAFECEN INVESTIGATION 58-67

5. RECOMMENDATIONS. None.

Distribution:  
List A  
CNO (Op-05F)

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DEPARTMENTAL COMMENTS FOR "CLOSE OUT" LETTER ON  
ORIGINAL REVIEW

- NC
1. Negative report is required.
  2. Positive comments will be in a format suitable for inclusion in the "close out" letter.
  3. Attach additional sheets if more space is required.

M&M DEPT:

Concur with the Conclusion and  
Recommendation.

NIK 231C  
INITIAL/CCODE

AERO-MED DEPT: A proposal for a study of emergency egress  
from helicopters has been made by the NAVAVNSAFECEN. The  
NAVAEROSPACE <sup>REFAC</sup> E1 Centro has the project assignment.  
NAVAVNSAFECEN Hq NASC/15 Ser 60/239 of 4 March 1966  
and NAVAIRSYSCOM letter AIR-531A/83:CAM of 20 June 1966  
refers.

NWP/433

No comments MS/42

INITIAL/CCODE

## COMPLETION SHEET

Action to Correction to	Action Required	Completed Code/Date
3750-1		/
DIR		/
Misc. Items for Action or Correction		
To Code	From Code/Date	
	/	/
	/	/
	/	/
	/	/
	/	/
	/	/
	/	/
	/	/
	/	/
	/	/
	/	/
	/	/

**CLOSED**

: 9 OCT 1967

Endorsements Reviewed and Action Completed on All Phases of this Report.



UNIT VMD-5  
MODEL UH-1E  
BUNC 152437

AAR REVIEW ROUTING SHEET

ADVANCE ROUTING

PRI	DEPT	DATE IN	DATE OUT	INIT	INTER DEPT.	ROUTING CODE
	M&M	7-21-67				
	AERO MED	9-14-67	31-6-7	D. B. H.	✓	8-11

DEPARTMENT REPRESENTATIVE INITIAL FOR RECEIPT OF REPORTS:  
REMARKS:

ORIGINAL ROUTING

DEADLINE DATE OUT OF NASC 12 SEP 1967 (calendar days)  
EXTENSIONS \_\_\_\_\_

DEPT	DATE IN	DEPT.	DEADLINE	DATE OUT	INIT.	INTER DEPT.	ROUT
A&R				10-4-67	Q		

NASC ENDORSEMENT ROUTING

PRI	DEPT	DATE IN	DATE OUT	INIT.
1	R&S	10/5/67	10/5/67	elw
2	M&M		10-5-67	
3	ADMIN			

ROUTING AFTER CLOSEOUT

DEPT	DATE IN	DATE OUT	INIT.	INTER DEPT.	ROUTING
AERO MED				/	/

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  2. Departments will be fully responsible and accountable for documents in their custody until checked back into Records Control Branch.
  3. Any Department desiring to retain this report longer than five (5) working days must notify Records Control Branch of their need for extension.

22 AUG 1967

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

SIXTH ENDORSEMENT on VMO-5 AAR ser 1-67A concerning UH-1E BuNo 152437  
accident occurring 14 April 1967, pilot GREENLESEFrom: Commander, Naval Air Systems Command  
To: Commander, U. S. Naval Aviation Safety Center

Subj: Aircraft Accident Report

1. Forwarded.
2. The requirement to conduct further testing of the H-1 tail rotor components is acknowledged. By separate correspondence, the contractor has been requested to conduct further study and testing of the H-1 tail rotor system to improve reliability and determine effects of various component failures.
3. The Commander, Naval Air Systems Command concurs in the requirement to replace the self-locking nut NAS 679-A4 in all critical areas of the H-1 aircraft. An engineering change proposal has been requested from the contractor to replace NAS 679-A4 with a castelated self-locking insert in the MS 17825 series. Additionally, action is in process to modify the General Aircraft Specification (SD-24) in order to provide for incorporation of self-locking nuts in all future aircraft.
4. H-1 Interim Airframe Bulletin No. 30 was issued to provide the torque values requested and further prescribes the onetime usage of the self-locking nut NAS 679-A4. These requirements will be incorporated in the H-1 maintenance manuals during the next revision.
5. Present UH-1E manuals were written to U. S. Army specifications vice standard NAVAIR specifications. U. S. Navy specifications were imposed in the Fiscal Year 1966 contract. Delivery of new manuals is scheduled for January 1968. Standardization of maintenance manuals is a continuing process.
6. H-1 Airframe Change 33 provides for incorporation of the APN-171 radar altimeter in the H-1 aircraft. Installation of the APN-171 is expected to commence in October 1967.
7. The Commander, Naval Air Systems Command concurs with the requirement to provide a suitable parachute egress procedure for the

AIR-4041:WHH  
22 AUG 1967

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

Subj: Aircraft Accident Report

H-1 aircraft. Accordingly, the Naval Aerospace Recovery Facility, El Centro, has been requested to review the H-1 parachute egress system in order to determine the degree of modification required to provide the desired capability.

(b) (6)



Copy to:  
COMNAVAIRFAC  
CMC (CODE AAP)  
CG FMFPAC  
CG 3RD MAW  
NAVAIRSYSCOMREP PNCLA  
CO, VMO-5  
CO, MITG-30  
NAVAIRTECHSERVFAC PHILA



3750  
80/

4263

25 JUL 1967

SPECIAL HANDLING REQUIRED IN ACCORDANCE  
WITH OPNAVINST 3750.6 SERIES

FIFTH ENDORSEMENT on VMO-5 AAR ser 1-67A concerning UH-1E BuNo 152437  
accident occurring 14 April 1967, pilot GREENLEESE

From: Commander Naval Air Force, U. S. Pacific Fleet  
To: Commander, U. S. Naval Aviation Safety Center  
Via: Commander, Naval Air Systems Command

Subj: VMO-5 AAR ser 1-67A

1. Readdressed and forwarded for NAVAIRSYSCOMHQ comments concerning recommendation 1, 2, 3, 4, 5, 7, and 8 contained in part II of the AAR.
2. The conclusions and recommendations of the Aircraft Accident Board, as modified by the remarks contained in subsequent endorsements are concurred with.

(b) (6)



Copy to:  
NAVAIRSYSCOMHQ  
COMNAVAVNSAFECEN (2)  
CMC (CODE AAP)  
CG FMFPAC  
CG 3RD MAW  
NAVAIRSYSCOMREP PNS  
CO VMO-5  
CO MHTG-30

18/mjm  
3750  
12 JUL 1967

FOURTH ENDORSEMENT on VMD 5 AAR, serial 1-67A, concerning UH-1E BuNo 152437 accident occurring 14Apr67, pilot GREENLEESE

From: Commanding General, Fleet Marine Force, Pacific  
To: Commander, U. S. Naval Aviation Safety Center  
Via: Commander, U. S. Naval Air Force, Pacific

Subj: VMD 5 Aircraft Accident Report, serial 1-67A

Ref: (a) OPNAVINST 3710.7C

1. Forwarded, concurring with the conclusions and recommendations of the Aircraft Accident Board and subsequent endorsers with the following additional comments:

a. It is not certain that the lack of parachutes had a bearing on the results of this accident. Helicopter emergency conditions above an overcast could well require bailout rather than risk autorotation or semi-uncontrolled flight through IFR conditions over unfavorable terrain. Had parachutes been available there is a possibility that the number of fatalities might have been decreased by personnel exiting the aircraft prior to ground contact.

b. Parachute requirements as set forth in reference (a), are considered adequate and should be adhered to.

2. The Aircraft Accident Board in their investigation of this accident used all available technical assistance and is commended for a professional thorough report.

*F. C. Tharin*

F. C. THARIN  
Acting

Copy to:  
NAVAVNSAFECEN (2)  
NAVAIRSYSCOMHQ  
CMC (CODE AAP)  
COMNAVAIRPAC  
CG, 3D MAW  
CG, FMIG-30  
CG, VMD-5  
FILE

"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

HEADQUARTERS  
MARINE OBSERVATION SQUADRON  
MHTG-30, 3dMAW, FMFPac  
MCALF, Camp Pendleton, California 92055

27 June 1967

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SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6  
SERIES

From: Commanding Officer, Marine Observation Squadron FIVE

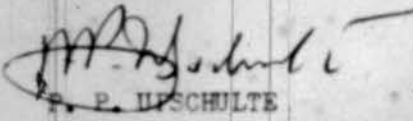
To: Commander, U S. Naval Aviation Safety Center

Subj: Supplementary Accident Data concerning VMO-5 AAR serial 1-67A,  
UH-1E BUNO 152437 occurring 14 April 1967, Pilot ~~FUNCHION~~ GREENLEESE  
submission of

Ref: (a) NASC ltr ser: 50/B158 of 27 APR 1967

- Encl: (1) Supplementary Accident Data Form for subject accident pages 1  
through 5  
(2) Reproduction of subject pilot's log covering month of accident  
and two (2) preceding calendar months  
(X) ~~XX~~  
(X) ~~XX~~

1. As requested by reference (a), the enclosures are forwarded.

  
P. P. URSCHULTE  
Acting

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SERIES

SUPPLEMENTARY ACCIDENT DATA

In addition to answering the following questions, enclose a duplicate of the pilot's log covering the month in which the accident occurred as well as the preceding two calendar months.

1. Date of mishap: year 1967 month April day 14
2. Aircraft model UH-1E
3. Bureau Number of aircraft 152437
4. Reporting custodian WMO-5
5. Pilot file number (b) (6)
6. Branch of service: Marine X Navy
7. Readiness Attack Carrier Air Wing (RCVW) trained? Yes        No X  
If Yes, date completed        /        /         
RCVW Squadron
8. Percentage of training completed if in a formal training status N/A
9. Length of time (mo.) in present squadron 33.5 mos
10. Pilot currently qualified in following aircraft (model and series)  
UH-1E


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SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

11. a. Specify training time (hrs.) with reference to date of mishap as follows:

	WST		OFT		CPT		LINK
	This model	All other models	This model	All other models	This model	All other models	
Previous 12 months	_____	_____	_____	_____	_____	_____	_____
Previous 6 months	_____	_____	_____	_____	_____	_____	_____
Previous 3 months	_____	_____	_____	_____	_____	_____	_____
Previous 1 month	_____	_____	_____	_____	_____	_____	_____

If training time in this model during previous three months was less than 3 hours in Weapons Systems Trainer (WST), Operational Flight Trainer (OFT), or Cockpit Training (CPT), indicate reason by checking appropriate spaces in part b.

b.	WST	OFT	CPT	LINK
(1) Pilot deployed	_____	_____	_____	_____
(2) Trainer not in area (station <u>Camp Pendleton</u> )	<u>X</u>	<u>X</u>		<u>X</u>
(3) Down for maintenance	_____	_____	_____	_____
(4) Not available due to trainer schedule	_____	_____	_____	_____
(5) Lack of trainer personnel	_____	_____	_____	_____
(6) Not available due to pilot's schedule	_____	_____	_____	_____
(7) Other reasons (specify): _____ _____	_____ _____	_____ _____	_____ _____	_____ _____

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SERIES

12. If flight was a maintenance test flight, was pilot designated by Commanding Officer as qualified maintenance test pilot? Yes \_\_\_\_\_ No \_\_\_\_\_
13. Commanding Officer's rating of pilot's ability: Superior X  
Average \_\_\_\_\_ Below Average \_\_\_\_\_
14. Length of time (mo.) Commanding Officer  
a. Has been aboard 9  
b. Has been in command of this squadron 9
15. Estimate of total time (hrs.) involved in accident investigation by:  
a. Accident board members 2100  
b. Wreckage recovery and salvage 250  
c. Supporting Personnel 80 (LOCAL TECH REPS)
16. Best estimate of operation and maintenance funds expended for investigation and salvage (e.g. civilian salaries, O&R cost, equipment rental, etc.) \$N/A  
Attach itemized breakdown.
17. Did funding cause a delay in wreckage recovery? Yes \_\_\_\_\_ No X  
If Yes, how long? \_\_\_\_\_ (days)
18. Was equipment for wreckage recovery adequate? Yes X No \_\_\_\_\_  
If No, list deficiencies. \_\_\_\_\_

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SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6  
SERIES

19. Number of accident board members 7

20. Specify number of accident board members who have attended the following schools :

- a. Safety Officer's School, USC
- b. Safety Officer's School, Monterey 1
- c. Safety Center 5-day ASO School
- d. Monterey Baccalaureate Curriculum Safety Course
- e.
- f. None of the above 6

21. Specify by checking if the:

	Manufacturer's Technical Reps were			Manufacturer's Engineers were		
	Requested	Available	Utilized	Requested	Available	Utilized
Airframe	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>
Engine	<u>X</u>	<u>X</u>	<u>X</u>	<u>      </u>	<u>      </u>	<u>      </u>
Other <u>Metallurgists (2)</u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>X</u>	<u>X</u>	<u>X</u>

22. Was pre-accident plan adequate? Yes X No       

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SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6  
SERIES.

23. Did previous training adequately prepare the accident board for its duties?

Yes ☒ No ☐

(If answer to questions 22 or 23 is No, please make comments)

COMMENTS:

The school trained member was furnished by MHTG-30 as requested by  
the AAR Board Senior Member.

24. Has the command submitted any previous recommendation that included  
factors similar to those associated with this mishap? Yes ☐ No ☒

COMMENTS: |

FOR OFFICIAL USE ONLY

MONTH FEBRUARY YEAR 1967  
 EXTRACT FROM AVIATORS FLIGHT LOG BOOK PILOT GREENLESE, W. E. (b) (6) USMC

DAY	AIRCRAFT		KIND OF FLIGHT CODE	PILOT TIME				SPECIAL CREW TIME	INSTRUMENT TIME			NIGHT TIME	LANDING		CATALUE	STD INST. APPL. COM. FILED			REMARKS
	MODEL	SERIAL NUMBER		TOTAL PILOT TIME	FIRST PILOT	CO-PILOT	DUAL PILOT		A DAY INST. TIME	SWIGHT INST. TIME	AS		OTHER LAND	CAR-RIER		NO.	TIME	AS.	
1	UH1E	154752	3A1	1.9	0.6	1.3						1.9	9N						(b) (6)
1	UH1E	152437	1A1	1.4	0.4	1.0							2						
1	UH1E	151881	1A1	1.2	0.2	1.0							4						FAM-2
1	UH1E	154753	1A2	1.4	0.7	0.7							3						INST-5
2	UH1E	152437	1A2	2.1	1.0	1.1		0.2	0.7				1			1	T	S	
2	UH1E	151882	1A2	2.2	1.1	1.1			1.0				2			1/10	WSS/S		(b) (6)
3	UH1E	153764	1A1	2.0	2.0	-			1.0				5			1/1	F/T S/S		
3	UH1E	153764	3A1	2.3	1.1	1.2			1.0				1			1/1	F/T S/S		(b) (6)
4	"	154752	1A1	1.3	0.3	1.0							3						FAM-3
6	"	154752	1A1	1.3	0.4	0.9							2						INST-2
6	"	154753	1A1	3.3	1.3	2.0							10						FAM-4.5
7	"	152437	1A2	1.1	0.1	1.0							1						
7	"	151271	1A1	1.3	1.0	0.3							5						NAV-1
7	"	154752	3A1	3.3	1.0	2.3						2.1	4						FAM-4
8	"	154753	1A1	1.3	0.2	1.1							2						(b) (6) FAM-6
8	"	153764	1A2	1.3	0.1	1.2							1						INST-3
8	"	154752	1A1	0.3	0.0	0.3													(b) (6) FAM-6
9	"	153759	1A1	1.4	0.4	1.0													
10	"	151882	1A1	2.4	0.2	2.2		0.2					3						INST-6/7
11	UH1E	154753	1A1	4.4	0.4	4.0						0.4	3						
11	"	"	1A1	1.4	0.1	1.0							3						FAM-7
12	"	"	1A1	2.0	0.1	1.9													(b) (6)
13	"	151271	1A1	0.2	0	0.2							2						
13	"	153764	1A1	1.3	0.2	1.1							1						FAM-Ex
13	"	151271	1A1	1.3	1.3								3						NAV-1
14	"	151880	1A1	1.3	0.3	1.0							1						(b) (6)
TOTAL THIS PAGE				44.7	14.8	29.9			0.4	A		A		71					
EIGHTH FORWARD																			
TOTAL TO DATE																			
TOTAL ACCUM. PILOT TIME				TOTAL, THIS FISCAL YEAR				TOTAL, THIS FISCAL YEAR											

Enclosure (2)



MONTH FEBRUARY

YEAR 1967

DAY	AIRCRAFT		KIND OF FLIGHT CODE	PILOT TIME				SPECIAL CREW TIME	INSTRUMENT TIME			NIGHT TIME	LANDING		CATALOG NO.	STD INST. APPR. COMPLETED		REMARKS
	MODEL	SERIAL NUMBER		TOTAL PILOT TIME	FIRST PILOT	CO-PILOT	DUAL PILOT		A DAY INST. TIME	NIGHT INST. TIME	OTHER LAND		SEA	TYPE		AS.		
BROUGHT FORWARD:				14.7	14.8	29.9			0.4		3.7	2.5		71				
14	WHE	051271	1A1	1.3	0.7	0.6								1				(b) (6) ACQ-1
14	"	"	3A1	1.5	0.5	1.0						1.5		3				(b) (6) RAL-3
16	"	051882	3A1	1.8	0.5	1.3						1.8		2				(b) (6)
17	"	"	1A1	1.4	0.7	0.7								5				
18	"	"	1A1	0.3	0.2	0.1								1				FAM-8
20	"	051271	1A1	1.1	0.2	0.9								5				
20	"	051752	1A3	1.1	0.2	0.9							2	2				(b) (6)
20	"	051857	1A4	1.5	0.7	0.8												(b) (6) G.S
21	"	"	1A1	1.3	0.2	1.1								5				(b) (6) FAM-3
21	"	052418	1A1	1.3	0.2	1.1								1				
23	"	051857	1A7	1.7	0.7	1.0								3				
23	"	051886	1A1	1.2	0.4	0.8								2				
24	"	052418	1A1	1.2	0.2	1.0								5				FAM-4
24	"	051886	1A1	1.2	0.2	1.0								3				RIN-1
26	"	052418	1J	1.5	0.3	1.2								1				
28	"	051859	1A1	1.3	0.2	1.1								1				FAM-6
28	"	"	"	1.3	0.3	1.0								3				(b) (6) FAM-6
TOTAL THIS PAGE				66.7	21.2	45.5			0.4	A		A						
BROUGHT FORWARD				5560.0	377.1	107.5	269.6		10.3	A		A						
TOTAL TO DATE				5736.6	443.8	120.7	315.1		10.7	S		S		11.0	3	476	2	
TOTAL, THIS FISCAL YEAR									15.6	S		S		48.7	3	592	2	

SPECIAL ACCUM.  
PILOT TIME

TOTAL, THIS FISCAL YEAR

TOTAL, THIS FISCAL YEAR

YEAR 1967

DAY	AIRCRAFT		KIND OF FLIGHT CODE	PILOT TIME				SPECIAL CREW TIME	INSTRUMENT TIME			NIGHT VFR TIME	LANDING		CATALOG NO.	STD INST. APPR. COMPLETED			REMARKS
	MODEL	SERIAL NUMBER		TOTAL PILOT TIME	FIRST PILOT	CO-PILOT	DUAL PILOT		A DAY		NIGHT		OTHER LAND	CARRIER		TYPE	A.S.		
									INST. TIME	A	INST. TIME							S	
1	UHLE	151859	1A1	1.3	0.2	1.1							5					(b) (6)	FAM-7
2	"	152017	1A1	1.4	0.6	0.8													WT-4
2	"	151857	1A1	1.0	0.2	0.8							3						
3	"	151880	1A1	2.7	0.6	2.1							3						
3	"	153760	3R1	3.2	3.2			0.4			1.9		3						INST-5
3	"	151858	1A3	1.1	0.2	0.9							4						
3	"	154752	1A1	1.2	0.2	1.0							4						
7	"	151859	1A1	0.5	0.1	0.4							2						KM-I
10	"	151858	1A1	2.3	.2	2.1							1						KM-I
14	"	152018	1R1	1.6	.2	1.4		.1					2					(b) (6)	KENYON
14	"	151858	1R1	1.6	.1	1.5							1						DOUGHERTY
14	"	151857	3A1	1.8	.4	1.4					1.8		8						WT-5
15	UHLE	153759	1A1	1.4	.4	1.0							4						WT-2
15	UHLE	151271	3A1	1.6	.4	1.2					1.6		2						WT-5
28	UHLE	151886	1R1	1.1	.6	.5							3					(b) (6)	U-PEN
29	UHLE	151881	1A1	1.3	.3	1.0							3					(b) (6)	WT-3
29	UHLE	151881	3A1	1.4	.6	.8					1.4		2						FAM-10
30	UHLE	151858	1A2	1.5	.1	1.4							1					(b) (6)	INST-3
30	UHLE	151858	1A2	1.3	.3	1.0							1						
TOTAL THIS PAGE				29.3	8.9	20.4		.5	A		A	6.7	52						
FWEIGHT FORWARD				5736.6	443.8	128.7	315.1	10.5	A		A	15.6	48.7	3	592	2			
TOTAL TO DATE				5765.9	473.1	137.6	335.5	11.0	A		A	15.6	55.4	3	644	2			
TOTAL ACTUAL FICTITIOUS				TOTAL, THIS FISCAL YEAR				TOTAL, THIS FICAL YEAR											



1967

TOTAL, THIS FICAL YEAR



25:WVC:der  
3750  
19 Jun 1967

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

THIRD ENDORSEMENT on VMO-5 AAR, serial 1-67A, concerning UH-1E, BuNo 152437, accident occurring 14 Apr 1967, pilot GREENLEESE

From: Commanding General, 3d Marine Aircraft Wing  
To: Commander, U. S. Naval Aviation Safety Center  
Via: (1) Commanding General, Fleet Marine Force, Pacific  
(2) Commander, Naval Air Force, U. S. Pacific Fleet

Subj: VMO-5 Aircraft Accident Report, serial 1-67A

1. Forwarded, concurring with the conclusions and recommendations of the Board and subsequent endorsers with the following comments:

a. Recommendation 2. All sizes of the NAS 679 series nuts should be replaced throughout the aircraft in critical areas with the castellated nut with self locking insert, MS 17825, with appropriate cotter key.

b. Recommendation 3. If this recommendation is adopted, it should apply to all nuts of this series, not specifically the one-fourth inch size. It is felt that the checking procedures for re-use of three-eighths inch nuts and smaller as prescribed in NAVWEPS 01-1A-8, if followed, are satisfactory for non-critical areas.

c. Recommendations 4 and 5. BUWEPS Instruction 5600.18B provides instructions for reporting errors or omissions in handbooks for Naval aircraft and engines on the Failure Unsatisfactory or Removal (FUR) Report Form. Effective 1 October 1965 all activities were directed by BUWEPS Notice 4700 of 28 Sep 1965 to use the Unsatisfactory Material/Condition Report (UR) Form 13070/5 to report safety and special situations vice the FUR form. This procedure should be followed in all cases when erroneous or inadequate information is noted in publications or clarification of maintenance procedures included therein is required.

d. Recommendation 8. Although lack of parachutes had no bearing on the results of this accident, this Command does not feel that efforts to provide parachute egress procedure for helicopters should be abandoned. There is no known parachute adaptable to the armored side panel of not only the UH-1E, but of any helicopter. Due to armored side panels attached to the armored seats, any emergency procedures for the presently installed seats would be hazardous and doubtful at best. It is recommended that:

(1) Investigation and evaluation be initiated to develop a parachute adaptable to the armored seats of all helicopters with added

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

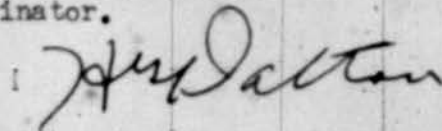
28938

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

emphasis on improvement of low altitude deployment capabilities of free fall type parachutes.

(2) The presently installed armored seat be modified to permit satisfactory emergency egress with parachute.

2. Correct "Copy to" distribution on the AAR and First Endorsement as indicated below with the inclusion of "CG, 3d MAW (DIRECT)". Correct distribution has been completed by the originator.



H. G. DALTON  
CHIEF OF STAFF

Copy to:  
NavAvnSafeCen (DIRECT VIA AIR MAIL) (2)  
NavAirSysComHq  
CMC (Code AAP)  
NavAirSysComRep, PNCLA  
ComNavAirPac (DIRECT)  
CG, FMFPac (DIRECT)  
CO, MHTG-30  
CO, VMO-5

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

25:GMS:1wp  
3750  
12 June 1967

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

SECOND ENDORSEMENT on VMO-5 AAR 1-67A, concerning UH-1E BuNo 152437,  
Accident occurring 14Apr67, Pilot GREENLEESE

From: Commanding Officer, Marine Helicopter Training Group 30  
To: Commander, U. S. Naval Aviation Safety Center  
Via: (1) Commanding General, 3d Marine Aircraft Wing  
(2) Commanding General, Fleet Marine Force, Pacific  
(3) Commander, Naval Air Force, U. S. Pacific Fleet

Subj: VMO-5 AAR 1-67A, Pilot GREENLEESE

1. Forwarded, concurring with the conclusions and recommendations of the Aircraft Accident Board and the first endorsement, in that the most probable cause factor was the failure/loss of the nut/bolt in the tail rotor crosshead and slider assembly.
2. The FIRST ENDORSEMENT should be numbered as page 35.

*John J. Doherty*  
JOHN J. DOHERTY

Copy to:  
NAVAVNSAFECEN (2) AIRMAIL  
NAVAIRSYSCOMHO  
CMC (Code AAP)  
NAVAIRSYSCOMREP PNS  
COMNAVAIRPAC  
CG, FMFPAC  
CG, 3dMAW  
CO, VMO-5  
FILE



SPECIAL HANDLING REQUIRED  
IN ACCORDANCE WITH OPNAV  
INST. 3750.6 SERIES

RTR:mtl  
3750.6  
1 June 1967

FIRST ENDORSEMENT on VMO-5 AAR 1-67A, UH-1E BUONO 152437, PILOT GREENLEESE,  
of 14 APRIL 1967

From: Commanding Officer, Marine Observation Squadron 5  
To: Commander, Naval Aviation Safety Center  
Via: Commanding Officer, Marine Helicopter Training Group 30  
Commanding General, 3d Marine Aircraft Wing  
Commanding General, Fleet Marine Force, Pacific  
Commander, Naval Air Forces, U. S. Pacific Fleet

Subj: Aircraft Accident Report, case of First Lieutenant William E.  
GREENLEESE (b) (6) USMC

1. Forwarded, concurring in the conclusions and recommendations with  
the following comments:

a. The squadron maintenance department has taken steps to re-emphasize, for all personnel, the correct maintenance procedures for critical areas of the aircraft. An aggressive and continuing program of training and quality control is presently being prosecuted.

b. (b) (5)

c. The precipitating cause of this accident is conjecture, based on educated guesses. There was an obvious "failure" or indication of a failure, hence the Mayday call. However, the lack of any survivors or witnesses should not indicate or imply that the pilot erred. It must remain unknown whether there was any fault or real failure involved.

D. K. *Tucker*  
TUCKER

## AIRCRAFT ACCIDENT REPORT

OPNAV FORM 3750-1A (Rev. 3-63) Page 1

SPECIAL HANDLING REQUIRED in accordance with

OPNAV FORM 3750-1

Para. 66, OPNAV INSTRUCTION 3750.6, effective 1-64

## PART 1 GENERAL

1. AIRCRAFT ACCIDENT BOARD APPOINTED BY	2. SERIAL NO	3. DTG (LOCAL) OF MISHAP	4. MODEL AIRCRAFT	5. BUREAU NUMBER
CO. VMO-5	1-57A	141245Z Apr 67	UH-1E	152437
6. TO Commander, Naval Aviation Safety Center	7. LOCATION OF MISHAP	8. TIME OF DAY	9. TIME IN FLIGHT	10. DAMAGE
VIA CO VMO-5	0680 RAD 10NM S1 Toro TACAN	NOON	0 + 26	ALPHA
CO MHTG-30	11. TYPE OF DAY	12. TIME IN FLIGHT	13. FLIGHT CODE	
CO 3dMAW	14. CLEARED FROM	15. TYPE CLEARANCE	16. AIRSPEED	17. A/C WEIGHT
CO ENRPAC	Coast Guard	VPR	60 kts E	7150
COMNAVSTA PAC	Station Pt. Vicente	18. ELEVATION AT TIME OF MISHAP	19. TERRAIN	(CRASH) 0
18. BRIEF DESCRIPTION OF MISHAP	20. LIST MODEL BUNO, REPORTING CUSTODIAN AND DAMAGE CLASSIFICATION OF ANY OTHER A/C INVOLVED	NONE		
Probable attempt at Forced Landing in Marginal Wx				

FACTOR	FACTOR	FACTOR
1. PILOT ERROR IN TECHNIQUE/JUDGMENT	9. SERVING PERSONNEL	17. WEATHER
2. PILOT DEVIATION FROM NATOPS PROCEDURES	10. LANDING SIGNAL OFFICER	18. DESIGN AIRCRAFT
3. PILOT INCORRECT OPERATION OF A/C SYSTEM	11. OTHER PERSONNEL (Specify)	19. DESIGN CREW EQUIPMENT
4. PILOT OTHER (Specify)	12. ADMINISTRATIVE	20. DESIGN OTHER (Specify)
5. CREW	13. FACILITIES-RUNWAY, OVERRUN TAXIWAY, FLIGHT DECK	21. ROLLING/PITCHING DECK REBOUND BEAR
6. MAINTENANCE PERSONNEL	14. FACILITIES-HAY AIDS, LANDING AIDS (CCA, CCA, RLS, HARBOR)	22. MATERIAL FAILURE/DYSFUNCTION
7. MAINTENANCE SUPERVISORY PERSONNEL	15. FACILITIES-CATAPULT, ARRESTING GEAR (Ship or field)	23. UNDETERMINED
8. SUPERVISORY OTHER (Specify)	16. FACILITIES OTHER (Specify)	24. OTHER (Specify)

1. NAME (Last, First, & Middle Initial)	2. GRADE	3. SERVICE NO.	4. DATE	5. BRANCH OF SERVICE	6. AGE	7. DESIG	8. GRADE	9. POSITION	10. SIGNATURE
PILOT (at controls at time of mishap)									
PRESENT WESSE, WILLIAM R.	1/Lt	(b) (6)		USMC	35	12	Instr	Pilot	A
CO-PILOT (Safety & Subj. Insp.)							Trans.	RH	
PUNCHEON, EDWARD J., Jr	2/Lt	(b) (6)		USMC	20	5 mos	Pilot	Pilot	

ITEM	ITEM	ITEM
11. ALL MODELS	17. CY LANDINGS DAY/NIGHT	ALL 264/31
12. ALL MODELS IN LAST 12 MONTHS	18. FCLP LANDINGS LAST 6 MONTHS DAY/NIGHT	IN MODEL 33/0
13. ALL MODELS IN LAST 3 MONTHS	19. INSTRUMENT HOURS LAST 3 MONTHS ACTUAL/SIMULATED	ALL 1/0
14. ALL SERIES THIS MODEL	20. NIGHT HOURS LAST 3 MONTHS	IN MODEL 1/0
A/C 1024	21. TOTAL HOURS IN (if not mishap)	ALL 4/7
GFT/CFT NA/NA	22. LAST PRIOR FLIGHT ALL SERIES THIS MODEL	IN MODEL 4/7
A/C 500	DATE 13 Apr 67	
GFT/CFT NA/NA	DURATION 2 Hrs	
A/C 176		
GFT/CFT NA/1A		
23. DATE/GRADE LIST NATOPS STANDARDIZATION CHECK	24. TYPE INSTRUMENT CARD	STANDARD
13/11/66 QUAL		

25. NAME (Last, First, & Middle Initial)	26. GRADE	27. SERVICE NO.	28. DATE	29. BRANCH OF SERVICE	30. AGE	31. DESIG	32. GRADE	33. POSITION	34. SIGNATURE
FLUM, HAROLD E.	I	Capt		USMC			A	OBS	Left Rear
MILLANE, RICHARD D.		Cpl		USMC			A	C/O	R. Rear



SECTION A IDENTIFICATION	1. AIRCRAFT ACCIDENT BOARD APPOINTED BY		2. SERIAL NO.	3. DTG (LOCAL) OF MISHAP	4. MODEL AIRCRAFT	5. BUREAU NUMBER
	CO. VMQ-5		1-67A	141245UA PR67	UH-1E	152437
	6. TO: Commander, Naval Aviation Safety Center			9. LOCATION OF MISHAP		10. DAMAGE
	7. VIA		8.	11. TIME OF DAY	12. TIME IN FLIGHT	13. FLIGHT CODE
				14. CLEARED FROM	TO	
				15. TYPE CLEARANCE	16. AIRSPEED	17. A/C WEIGHT
	18. BRIEF DESCRIPTION OF MISHAP			19. ELEVATION AT TIME OF MISHAP		
				S. L. TERRAIN		
	20. LIST MODEL, BUINO, REPORTING CUSTODIAN AND DAMAGE CLASSIFICATION OF ANY OTHER A/C INVOLVED (Complete OPRAT Form STD-1 for each A/C)					

FACTOR		FACTOR		FACTOR	
1	PILOT ERROR IN TECHNIQUE/JUDGMENT	9	SERVICING PERSONNEL	17	WEATHER
2	PILOT DEVIATION FROM NATOPS PROCEDURES	10	LANDING SIGNAL OFFICER	18	DESIGN AIRCRAFT
3	PILOT INCORRECT OPERATION OF A/C SYSTEM	11	OTHER PERSONNEL (Specify)	19	DESIGN CREW EQUIPMENT
4	PILOT OTHER (Specify)	12	ADMINISTRATIVE	20	DESIGN OTHER (Specify)
5	CREW	13	FACILITIES-BURNING, OVERBURN TAXIWAY, FLIGHT DECK	21	ROLLING/PITCHING DECK BOUNCH BEAM
6	MAINTENANCE PERSONNEL	14	FACILITIES-RAY AIDS, LANDING AIDS (CCA, CCA, ILS, MIRRO)	22	MATERIAL FAILURE/MALFUNCTION
7	MAINTENANCE SUPERVISORY PERSONNEL	15	FACILITIES-CATAPULT, ARRESTING GEAR (Specify or fault)	23	UNDETERMINED
8	SUPERVISORY OTHER (Specify)	16	FACILITIES OTHER (Specify)	24	OTHER (Specify)

1 NAME (Last, first & middle initial)	2-3 Rank/ Grade	4 Duty Station	5 Service Number	6 Branch of Service	7 Age	8 Name of Ship	9 Rating	10 Position	11 Weight (lbs)
PILOT (at controls at time of mishap)									
CO-PILOT (identity & submit separate page if)									
MUNCHEON, EDWARD J. Jr 2/1+	(b) (6)			USMCB	20	5 mos		Trans. Pilot	RH Seat

ITEM			ITEM		
11 ALL MODELS		337	17 CY LANDINGS DAY/NIGHT	ALL	6 / 4
12 ALL MODELS IN LAST 12 MONTHS		264	18 FCPL LANDINGS LAST 6 MONTHS DAY/NIGHT	IN MODEL	0 / 0
13 ALL MODELS IN LAST 3 MONTHS		63	19 INSTRUMENT HOURS LAST 3 MONTHS ACTUAL/SIMULATED	ALL	0 / 0
14 ALL SERIES THIS MODEL	A/C	97	20 NIGHT HOURS LAST 3 MONTHS	IN MODEL	0 / 9
15 ALL SERIES THIS MODEL LAST 12 MONTHS	OFT/OPT	NA	21 TOTAL HOURS IN FLIGHT (SEE FLIGHT LOG)	ALL	8
16 ALL SERIES THIS MODEL LAST 3 MONTHS	A/C	97	22 LAST PRIOR FLIGHT ALL SERIES THIS MODEL	IN MODEL	8
	OFT/OPT	NA	23 DATE/GRADE LAST NATOPS STANDARDIZATION CHECK		173
24 TYPE INSTRUMENT CARD			25 DATE		12 APR 67
			26 DURATION		1

[illegible]



## SECTION A. IDENTIFICATION

SECTION A - IDENTIFICATION	1. AIRCRAFT ACCIDENT BOARD APPOINTED BY		2. SERIAL NO.	3. DTG (LOCAL) OF MISHAP	4. MODEL AIRCRAFT	5. BUREAU NUMBER
	CO. VMO-5		1-67A	141245UAPR67	UH-1H	152437
	6. TO: Commander, Naval Aviation Safety Center			9. LOCATION OF MISHAP		
	7. VIA			8. 11. TIME OF DAY	12. TIME IN FLIGHT	13. FLIGHT CODE
				14. CLEARED		
				FROM TO		
				15. TYPE CLEARANCE	16. AIRSPEED	17. A/C WEIGHT
	18. BRIEF DESCRIPTION OF MISHAP			19. ELEVATION AT TIME OF MISHAP		
				S. L. TERRAIN		
	20. LIST MODEL, BUREAU, REPORTING CUSTODIAN AND DAMAGE CLASSIFICATION OF ANY OTHER A/C INVOLVED (Continue Form 8750-1 for each A/C)					

## SECTION B. CON. RESULTING FACTORS

✓	FACTOR	✓	FACTOR	✓	FACTOR
	1. PILOT ERROR IN TECHNIQUE/JUDGMENT		9. SERVICING PERSONNEL		17. WEATHER
	2. PILOT DEVIATION FROM NATOPS PROCEDURES		10. LANDING SIGNAL OFFICER		18. DESIGN AIRCRAFT
	3. PILOT INCORRECT OPERATION OF ALL TESTS		11. OTHER PERSONNEL (Specify)		19. DESIGN CREW EQUIPMENT
	4. PILOT OTHER (Specify)		12. ADMINISTRATIVE		20. DESIGN OTHER (Specify)
	5. CREW		13. FACILITIES-RUNWAY, OVERRUN TAXIWAY, FLIGHT DECK		21. ROLLING/PITCHING DECK ROUGH SEAS
	6. MAINTENANCE PERSONNEL		14. FACILITIES-RVW AIDS, LANDING AIDS (CCA, CCA, RLS, MIRROR)		22. MATERIAL FAILURE/MALFUNCTION
	7. MAINTENANCE SUPERVISORY PERSONNEL		15. FACILITIES-CATAPULT, ARRESTING GEAR (Ship or field)		23. UNDETERMINED
	8. 2. PERMISSORY OTHER (Specify)		16. FACILITIES OTHER (Specify)		24. OTHER (Specify)

## SECTION C: PERSONNEL DATA

1 NAME (Last, first & middle initial)	2 GRADE	3 AIR FORCE NO.	4 SERVICE NO.	5 BRANCH OF SERVICE	6 AGE	7 YEARS OF SER.	8 WEIGHT	9 HEIGHT	10 BLOOD TYPE
PILOT (at controls at time of mishap)									
OBSERVER PLUM, HAROLD E.		Capt. (b) (6)		USMC	31	8	Observer	Left Rear	A

ITEM			ITEM		
11 ALL MODELS		2243	17 CY LANDING DAY/NIGHT	ALL	37/0
12 ALL MODELS IN LAST 12 MONTHS		521	18 FCLP LANDING LAST 6 MONTHS DAY/NIGHT	IN MODEL	10/0
13 ALL MODELS IN LAST 3 MONTHS		21	19 INSTRUMENT HOURS LAST 3 MONTHS ACTUAL / SIMULATED	ALL	0/0
14 ALL SERIES THIS MODEL	A/C	711	20 NIGHT HOURS LAST 3 MONTHS	IN MODEL	0/1
	OFT/OFT	NA/NA		ALL	2
15 ALL SERIES THIS MODEL LAST 12 MONTHS	A/C	521	21 TOTAL HOURS IN JEMS (if not mishap) HELIOS (if helo mishap)	IN MODEL	2
	OFT/OFT	NA/NA			
16 ALL SERIES THIS MODEL LAST 3 MONTHS	A/C	21	22 LAST PRIOR FLIGHT ALL SERIES THIS MODEL	DATE	973 14 Apr 57
	OFT/OFT	NA/NA		DURATION	1
23 DATE (GRIFT LAST NATOPS STANDARDIZATION CHECK)	1/15/66 ONLT.		24 TYPE INSTRUMENT CARD	STANDARD	

25 NAME (Last, first & middle initial)	26 GRADE	27 AIR FORCE NO.	28 SERVICE NO.	29 BRANCH OF SERVICE	30 AGE	31 YEARS OF SER.	32 WEIGHT	33 HEIGHT	34 BLOOD TYPE
OTHER PERSONS									

## PART II MAINTENANCE, MATERIAL AND FACILITIES DATA

1. DATE OF MANUFACTURE	2. FLIGHT HRS. SINCE ACCEPTANCE	3. NO. OF PAR/OVERHAUL	4. MONTHS SINCE LAST PAR/OVERHAUL	5. FLT. HRS. SINCE LAST PAR/OVERHAUL	6. LAST PAR/OVERHAUL ACTIVITY	7. TYPE OF LAST CHECK PERFORMED	8. FLIGHT HOURS SINCE LAST CHECK	9. DAYS SINCE LAST CHECK
28 Jun 66	536.9	NONE	N/A	N/A	N/A	2nd ODD	66.1	24

1. ENGINE MODEL	2. ENGINE SERIAL NUMBER	3. FLIGHT HRS. SINCE ACCEPTANCE	4. NUMBER OF OVERHAULS	5. WAS DIR REQUESTED	6. FLT. HRS. SINCE LAST OVERHAUL	7. LAST OVERHAUL ACTIVITY	8. TYPE OF LAST CHECK PERFORMED	9. FLIGHT HOURS SINCE LAST CHECK	10. DAYS SINCE LAST CHECK
(1) T53-L-11	LE 09582	966.7	1(one)	YES	523.3	PARADMAC C.C. TEX	2nd ODD	66.1	24
(2)									
(3)									
(4)									

1. COMPONENT INVOLVED NOMENCLATURE	2. MANUFACTURER'S PART NUMBER	3. TOTAL HRS. ON PART	4. NO. OF OVERHAULS	5. HOURS SINCE LAST OVERHAUL	6. OVERHAUL ACTIVITY	7. WAS DIR REQUESTED	8. SER. NO. FVB/AMPEUB
(1) Sump <b>ENGOL (7)</b>							
(2)							
(3)							
(4)							

1. PARTS REPAIRED		3. DIRECT MANHOURS INVOLVED	2. PARTS REPLACED	
PART NUMBER	NOMENCLATURE		PART NUMBER	NOMENCLATURE

E. ENGINE FAILURES

JET ENGINE FLAMEOUT (Include intentional securing to prevent engine damage)														
AT TIME OF FLAMEOUT	1. ALTITUDE	2. IAS	3. RPM	4. EGT	5. MANEUVER AT TIME OF FLAMEOUT	6. FUEL FLOW	7. ATTITUDE							
8. G FORCES	9. RELIGHT <div style="display: flex; justify-content: space-between; align-items: center;"> <input type="checkbox"/> ATTEMPTED           <input type="checkbox"/> ACCOMPLISHED         </div>		10. ALTITUDE	11. IAS	12. MAX EGT	13. FUEL CONTROL <div style="display: flex; justify-content: space-between; align-items: center;"> <input type="checkbox"/> PRIMARY           <input type="checkbox"/> MANUAL         </div>		14. NO. RELIGHT ATTEMPTS						
INTENTIONAL SECURE	15. ENGINE SYMPTOMS				16. CAUSE OF SYMPTOMS									
RECIPROCATING ENGINE FAILURE														
17. ALTITUDE	18. IAS	19. ALTITUDE	20. RPM	21. MAP	22. TORQUE/BHP	23. FUEL FLOW PRESSURE	24. OIL PRESSURE							
INTENTIONAL SECURE	25. ENGINE SYMPTOMS				26. CAUSE OF SYMPTOMS									

IDENTIFY OTHER REPORTS CONCERNING THIS MISAP	
1. AMFUR SERIAL NUMBER	NONE
2. DIR MESSAGE REQUEST DATE-TIME-GROUP	PARADMAC INTRON THREE ZERO 192246Z APR 67 NOTAL
3. OTHER	Bell Helicopter Company Technical Report No 204-099-869 dtd 18 MAY 67 (See Page 23)



1. EQUIPMENT INVOLVED <input type="checkbox"/> CATAPULT <input type="checkbox"/> ARRESTING GEAR		2. PRESSURE SETTINGS	3. WIND OVER DECK	4. RELATIVE WIND	5. APPROACH/LEND SPEED
6. MARK NUMBER	7. MODEL NUMBER	8. LOCATION OF SHIP		9. LAUNCHING BRIGLE AND BRIGLE ARRESTER	
10. CATAPULT/ARRESTING GEAR BULLETINS OR NONCOMPLIANCE USED					

G. SHIP'S DATA

11. This portion shall be completed whenever (1) an aircraft accident involves arresting gear barrier and/or barricade equipment, or (2) an aircraft accident involves malfunctioning of arresting gear, barrier and/or barricade equipment. Incidents or routine damage to cables, weldings and other expendable equipment need not be reported herein.						
ENGAGED	12. DECK RUNOUT (FEET)	13. RAM TRAVEL (INCHES)	14. CONTROL VALVE SETTINGS		15. ACCUMULATOR PRESSURE (PSI)	16. COMMENTS (For cable failures specify no loadings and months in service)
			CONSTANT PRESSURE DOME (P.S.I.)	RATIO		
DECK PENDANT						
DECK PENDANT						
BARRIER/BARRICADE						

H. WEATHER &amp; DEPLOYMENT

FOR ACCIDENTS ABOARD CARRIERS (complete on pilot)					
1. DATE DEPLOYED CONUS		3. DAY HOURS/LANDINGS SINCE DEPLOYMENT		4. DAY HOURS/LANDINGS LAST 30 DAYS	
2. NO. DAYS OPERATING PERIOD		6. NIGHT HOURS/LANDINGS SINCE DEPLOYMENT		7. NIGHT HOURS/LANDINGS LAST 30 DAYS	
5. INST. HOURS LOGGED SINCE DEPLOYMENT ACTUAL/SIMULATED					
WEATHER AT SCENE OF MISHAP (CRASH SITE: SEE P. 6)					
1. CLOUDS	2. VISIBILITY	3. RELATIVE WIND DIRECTION AND VELOCITY	4. TEMPERATURE SURFACE OUTSIDE AIR	5. DEW POINT	6. ALTITUDE SETTINGS
0	Est 1/16 mi	Lt and Variable Pa SE			
7. OTHER WEATHER CONDITIONS (Include clouds, wind, rain, sea state, density altitude, as appropriate)					
Tops Estimated 5500' Variable. Winds Over Ridge Est 260/10-15. Freezing level 10,000 Feet.					

PART III ADDITIONAL INFORMATION			2. COPY DISTRIBUTION		
PART	SECTION	ITEM	2CC NAVJAGSAFECON DIRECT (AAR)		
		1.	1CC BUREAU DIRECT (AAR)		
		1. 6 day AAR extension granted by COMNAVJAGPAC 272209ZAPR67 NOTAL	1CC CMC(AAR)Direct		
		2. 10 day additional AAR extension granted by COMNAVJAGPAC 101749ZMAY67 NOTAL	NAVJAG SYS COM REP PN		
COST DAMAGE TO:			8. DATE SUBMITTED TO CO		
3. GOVERNMENT PROPERTY			26 May 1967		
4. PRIVATE PROPERTY					

PART IV SIGNATURES OF THE BOARD					
1. SENIOR MEMBER	2. MEMBER			3. MEMBER	
Maj Phillip P. UPSCHULTE USNR VMO-5 XO	Maj (b) (6)			HMNT-302 ASO	
UNIT BILLET			UNIT BILLET		
3. FLIGHT SURGEON/HELICOPTER	4. MEMBER			5. MEMBER	
(b) (6)	(b) (6)			(b) (6)	
Lt (MC) USNR	Capt (b) (6)			VMO-5 NATOPS IN	
UNIT BILLET			UNIT BILLET		

\* When preparing Incident and Ground Accident reports, items indicated by an asterisk in the upper right hand corner must be filled in. Other items considered appropriate should also be filled in.

5. Capt (b) (6) VMO-5 AsstOpsO
6. 1/Lt (b) (6) VMO-5 AvionicsO
7. 2/Lt (b) (6) VMO-5 AsstAMO



## PART V THE ACCIDENT

The accident occurred on 14 April 1967 during the third phase of a Pilot Qualified in Model (PQM) flight check in UH-1E BuNo 152437 Modex UV-13. Four crew members were aboard: Lieutenant GREENLEESE, instructor and pilot in command; Lieutenant FUNCHEON, transition pilot being checked; Captain PLUM, pilot observer preparing for UH-1E flight instructor duties; and Corporal MILLANE, crew chief. No other aircraft were involved in the flight.

At 1219U UV-13 departed Pt. Vicente Coast Guard Station on the tactics phase of the check flight. A flight plan was filed airborne at 1222U with Long Beach Approach Control VFR from Pt. Vicente direct El Toro direct Camp Pendleton. Estimated time enroute was 1.5 hours, with two hours fuel on board. The general weather (El Toro) at this time was 2600 broken, 10 miles visibility.

At 1228U UV-13 conducted a position report to Long Beach Approach Control when in the vicinity of Huntington Beach. This is the last known two way contact with the aircraft. (See Encl 2)

At 1245U UV-13 (Lieutenant FUNCHEON) broadcast the following on 340.2 megacycles (Navy Primary): "Mayday, Mayday, Mayday. Uniform Victor One Three (unkey). One four miles south (end of transmission)".

An extensive military and civilian air and sea search ended on 16 April with the discovery of the crash site of UV-13 in the Santa Ana Mountains on the 068° radial 10 NM from El Toro Tacan. The wreckage was at the 4400 foot level on the steep south slope of Santiago Peak (5696 feet) in extremely rugged terrain. All four crew members had been fatally injured in the crash and were still in the wreckage.

No known witnesses observed the impact or the flight of the aircraft immediately preceding it.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

## PART VI DAMAGE TO THE AIRCRAFT

### A. GENERAL

The aircraft received strike damage at impact, with the ensuing fire consuming the fuselage forward of station 250 (mid tail boom). The tail boom and vertical fin remained relatively intact, as did the engine and main rotor head (encl (3) and (4)).

### B. IMPACT ANALYSIS (See encl (5) and (6))

The impact attitude of the aircraft was a 60° left banked turn with a slight right skid, 75° nose down. There was a pitching down motion around the aircraft center of gravity, and minimum ground speed. Vertical descent was high but decreasing. The impact angle was approximately 80°. The probable impact sequence (encl (5)) was as follows:

1. The white blade struck a glancing blow at the 12 o'clock position, with the outer three feet of the blade bending up. Both stabilizer bars sheared toward the 12 o'clock position, ending up 17 and 33 feet downslope.

2. The chin bubble struck the ground, causing the cockpit/cabin section to shear at station 80 on the lower fuselage, vertically up the cabin door frame, aft to station 123 and upward through the overhead. The sheared cabin/cockpit section then started to slide forward, eventually ending up 18 feet further downslope.

3. The red blade impacted solidly at the 3 o'clock position, with the blade tip burying itself in the ground as the rest of the blade disintegrated and the fragments were hurled downslope.

4. The right and left skids impacted and buried themselves 27 and 25 inches, respectively, on a heading of 175°.

5. The white blade impacted (second time) solidly at the 3 o'clock position, depositing its tip weight within 6 inches of the red blade tip weight.

6. As the after fuselage and tail boom came over the top, the bottom angles of the fuselage main longitudinal support beams (beam 14) impacted heading 165° and were buried 24.5 inches (right side) and 27 inches (left side) on an angle of 70° to the slope.

7. The main transmission and rotor head assembly ripped free, rotated forward and down toward the cabin and swept through the cockpit, carrying with it part of the overhead circuit breaker panel, center pedestal, instrument panel and transmission housing, and buried them more than two feet into the ground. The transmission and rotor head assembly ultimately came to rest outboard of the cabin section, with the mast head at the 3 o'clock position. The white blade remained relatively intact, still attached to the rotor head.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

8. The engine moved forward and right, impacting the 5th mount support beam as it catapulted over the main fuselage and came to rest below the transmission and to the right of the cockpit section.

9. During this sequence the tail boom sheared at station 250 and came over the top of the forward fuselage tail first. The 90° gearbox ripped free and both tail rotor blades struck the vertical fin, the first striking the vertical fin drive shaft cover a glancing blow and the second striking solidly, shearing the 5th section of the drive shaft. The 90° gearbox and tail rotor hub and blade assembly came to rest in the vicinity of the initial nose impact point; the tail boom came to rest at the 1 o'clock position of the cockpit section, oriented tail first down slope and outside the resulting fire.

10. Burning fuel from the ruptured fuel cells enveloped the center of the wreckage, including the cockpit and cabin section, with intense fire.

11. The wreckage dispersion in the immediate crash site was limited to 40 feet longitudinally from the skid impact points, 155° down slope to the hydraulic module found below the cockpit section. Laterally the main wreckage area measured 31 feet at its widest point.

#### C. DAMAGE ANALYSIS

##### 1. ENGINE

The external condition of the engine at the crash scene was as follows:

The engine came to rest in an upright and crosswise attitude, slightly to the right of center of the main crash/debris area. It was almost wholly intact except for segments of the compressor inlet housing and reduction gear case broken away between the 4 and 6 o'clock positions (looking forward). There was no airframe structural enclosure remaining. All engine and transmission cowling had been either thrown clear or burned away.

The exhaust tail pipe assembly had been forcibly wrenched away from its clamping to the exhaust diffuser. It was deformed to an almost flattened condition, apparently by a severe blow.

The second stage turbine assembly was intact and with no apparent damage other than from the post-crash fire. It could be rotated easily by hand to a limited amount of travel, and then with a heavy drag, indicating an internal interference or turbine rub. Rotation of the 2nd stage turbine wheel showed resultant normal rotation of the power output shaft. This confirmed the integrity of the engine power train.

The service coupling of the power output shaft was bent a few degrees at its base. Portions of the transmission drive shaft were still attached to the coupling but the major portion appeared to have been torsionally

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES



broken away. The remainder of the short shaft segment was found in the debris, close by.

An inspection of the engine inlet area disclosed severe fire evidence and heavy inlet guide vane damage. All inlet guide vanes were burned, badly bent and torn at their trailing edges.

All three engine mounts were securely attached to the engine. The engine mounting structural supports were torn loose or burnt away from the engine deck at the attaching point. The steel portion of the droop cam was found but the mounting bracket had been burnt away in the fire. The aft portion of the linear actuator rod and worm gear was still attached to the overspeed governor control lever but the electrical control box of the actuator was burnt away. The overspeed governor control lever was slightly bent.

The throttle linkage was firmly attached to the fuel control and the power lever was in the nearly wide open position and was seized in this condition. Most of the fuel control was intact and not badly burnt. The overspeed governor was totally intact with no apparent damage.

The overspeed governor tachometer drive gearbox was destroyed by fire. A few of the gears were noticed in the fire debris.

All oil and fuel lines were in place and intact, although badly burnt.

There was one deep dent in the combustor housing between the 10 and 11 o'clock positions. There was also a burnt and crushed-in portion at the top of the compressor inlet housing near the anti-icing, hot air transfer tube plug.

## 2. COMMUNICATION/NAVIGATION COMPONENTS(Refer to encl (6))

The Comm/Nav components located in the starboard-aft avionics compartment, IFF (AN/APX-6), SIF (AN/APA-89) and HF coupler (CU-351), were demolished and burnt. Fragments and sub-assemblies of these units were found in the northwest quadrant of the intense fire area. The HF radio set (AN/ARC-94) was not installed in the aircraft.

The FM (AN/ARC-44) and Low Frequency ADF (AN/ARN-59) radio sets and their associated components, located in the starboard-nose compartment, were also demolished and burnt. Fragments of these units were found in the center-left section of the intense fire area(looking upslope).

The UHF (AN/ARC-52) and TACAN (AN/ARN-52(V)) radio sets, located in the port-nose compartment, were severely damaged and partially burnt.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

Fragments of Avionics control units were found distributed throughout the wreckage, however the bulk of these units and all instruments except the fuel quantity indicator were found in the south-central section of the intense fire area. The fuel quantity indicator was found on the southeast edge of the main impact crater.

### 3. ENGINE/TRANSMISSION/FLIGHT INSTRUMENTS

INDICATOR	DAMAGE
Exhaust Gas Temperature	Severe
Engine Oil Temperature	Severe
Engine Oil Pressure	Severe
Gas Producer Tachometer	Severe
Transmission Oil Temperature	Severe
Transmission Oil Pressure	Severe
Torque Pressure	Severe
Dual Tachometer	Severe
Fuel Quantity	Severe
Fuel Pressure	Severe
Air Speed (2)	Severe
Altimeter (2)	Severe
Vertical Speed (2)	Severe; one not recovered
Outside Air Temperature	Severe
Attitude, Pilot	Severe, partially recovered
Attitude, Co-pilot	Severe
Turn and Bank (2)	Severe
Bearing/distance/heading	Severe
Wet Compass	Not recovered
Course Deviation	Severe
AC and DC Voltmeters	Severe
DC Loadmeter	Not recovered
Clock	Not recovered

4. Component DIR's Encl (7) lists the history of the components that were sent to ARADMAC for DIR under NAVAIRSYSCOMREP PAC control number 2409-67. The engine S/N LE 09582 was received at Corpus Christi on 23 April and the remainder of the components listed below were received on 28 April.

- a. Rotor head (intact) with blade stubs attached; stabilizer bars (2); mast with swash plate, scissors and sleeve assembly.
- b. Transmission ring gear assembly and associated parts.
- c. Tail rotor 90° gear box with hub and blade assembly; both tail rotor blades; 42° gear box; #2 and #5 sections of drive shaft; control chain; control cable (piece).
- d. Hydraulic module (1); hydraulic pumps (2); and servo control rods (3).

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The ARADMAC DIR's on the above components are attached as enclosures (8) through (18). A Bell Helicopter Company Technical Report commenting on the DIR's, on tail rotor component testing at the factory and on wreckage analysis at Camp Pendleton is attached as enclosure (19).

The Naval Aviation Safety School, Naval Postgraduate School, Monterey, California has initiated a request for all wreckage parts to be used for training purposes.



## PART VII INVESTIGATION AND ANALYSIS

### A. Technical Assistance

The following people rendered technical assistance during the investigation:

Mr. Frank Arneaud, Contractor Representative, Lycoming Division, AVCO  
Mr. George Bean, Aviation Safety Specialist, USABAAAR  
Mr. Robert Breyer, Senior Metallurgist, Bell Helicopter Company  
Mr. Robert Eggers, Project Engineer, Bell Helicopter Company  
Cdr. (b) (6) Independent Investigator, Naval Aviation Safety Center  
Mr. Jim Le Vesque, Contractor Representative, Bell Helicopter Company  
Mr. Don Swartwout, Metallurgist, Bell Helicopter Company  
Mr. Joe Tyler, Contractor Representative, Bell Helicopter Company

### B. AAR Board Augmentation

The senior member of the AAR Board requested assignment of a school trained safety officer to the board. CO, MHTG-30 subsequently assigned Major (b) (6) USMC, ASO, HMMT-302.

### C. DIR's

All DIR's requested were processed by ARADMAC, Corpus Christi. Components that were sent are listed at the end of section VI. Lt. (b) (6) of the AAR Board accompanied the engine to Corpus Christi and remained at ARADMAC through completion of all DIR's except the overspeed governor flyweight analysis. The DIR's are attached as enclosures (3) through (18).

### D. Bell Helicopter Tests

Bell conducted certain static and dynamic testing of tail rotor components at the board's request. Test results are appended as encl (19).

### E. Main Difficulties Encountered

1. Lack of good crash site accessibility/weather. Personnel were lifted in/out by helo hoist and wreckage was brought out as helo external cargo. A 30° rock slide 150 feet below the crash site was the primary pickup/drop point. (encl (3)). Adverse weather delayed completion of crash site investigation and wreckage removal until 23 April.

2. There were no known witnesses to the crash or the flight of the aircraft immediately preceding it.

3. The fuselage forward of station 250 (mid tail boom) was almost entirely consumed by fire, including all instrumentation. Much of the metal in this section was reduced to slag (enclosures (3) and (4)).

4. Submission of the AAR was delayed pending completion of the ARAD-MAC DIR's and Bell Helicopter tail rotor component tests.

#### F. The Investigation

The accident investigation commenced on 17 April 1967 with the AAR Board proceeding to the crash site by CH-46 helicopter from HMMT-302. Accompanying the board to the crash site were Mr. Joe Tyler, VMO-5 Contractor Representative for Bell Helicopter, Mr. Frank Arneaud, VMO-5 Contractor Representative for Lycoming, and Mr. J. L. Eatherton, Medical Investigator for the Orange County Coroner's Office. Airborne photographs were taken on arrival, after which all personnel descended by helicopter hoist to the rock slide. No guards had been posted at the wreckage because of its extreme inaccessibility. The wreckage pattern was measured and plotted (encl 6) and photographs were taken. The flight surgeon and the civilian medical investigator removed the bodies of all four crew members from the wreckage for pickup by helicopter. The bodies were sent to Blower Brothers Mortuary, Santa Ana for autopsy by the Orange County Coroner's Office.

The crash site is located at the 4400 foot level on the south slope of Santiago Peak (5696 feet MSL) which is the highest peak in the area. (encl 20). The peak is directly above the crash site but line of sight is blocked by the military crest. The high ridge line extends east-west from the peak with numerous small canyons generally oriented north-south from the ridge line. A 30-35° slope exists throughout the immediate crash area with the crash site itself measured at 32°. Extremely dense, stunted tree-type vegetation, generally from three to ten feet high, grows throughout the area, and greatly hinders movement at other than the immediate crash site.

Initial visual inspection of the wreckage showed it to be very compact in distribution, but with extensive fire damage (enclosures (3) and (4)). Major sections of the aircraft readily identifiable were the engine, the main rotor system with the white blade attached, the tail rotor 90° gear box, hub and blade assembly and a large section of the tail boom and vertical fin. The fuselage forward of station 250, including the cockpit and cabin, was almost totally consumed by fire. All extremities of the aircraft were found in the immediate impact area, including both main rotor blade tips, the stabilizer bars, chin bubble (fragmented and burned), right and left skids, right and left synchronized elevators, tail skid, tail rotor blades and the FM antenna. The only sizeable pieces of wreckage found outside the immediate impact area were parts of the red main rotor blade, found variously 100 to 250 feet down slope from the main impact point (encl (6)).

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At the board's request the Naval Aviation Safety Center assigned an investigator, Cdr (b) (6) to the accident. He worked with the board 20-27 April and with ARADMAC on the DIR's 28 April - 4 May. He requested and received the assistance of Mr. George Bean, USNAAAR, in following the DIR's through ARADMAC.

Bell Helicopter Corporation provided Mr. Don Swartwout to work with ARADMAC and Mr. Robert Eggers and Mr. Robert Breyer to work with the board on wreckage analysis at Camp Pendleton (3-5 May). Mr. Jim Le Vesque, resident Bell Contractor Representative at NAS North Island, also assisted during this period.

The AAR Board, with the assistance of HAMS-30 and HMMT-302, recovered all wreckage parts not reduced to slag and transported them to Camp Pendleton. The wreckage pieces were arranged on the hangar deck in their relative positions in the aircraft. All parts were checked for evidence of possible airborne failure, pre-impact fire, component/system malfunction or control jamming. It was noted that one bolt was missing from the tail rotor crosshead and slider assembly (encl (21)); the 90° gear box, with tail rotor hub and blade assembly, was subsequently sent to ARADMAC for DIR. The wreckage was completely laid out a second time for investigation by Mr. Eggers and Mr. Breyer and re-inspection by the board. (All DIR components had already been sent to ARADMAC). No possible cause factor was discovered. Information was gained, however, that assisted in impact analysis. The BHC investigative analysis is reported in encl (19).

The AAB determined that:

1. The flight was the third phase of a properly scheduled, cleared and briefed Pilot Qualified in Model (PQM) check (encl (22)). Lt. Greenleese was designated Instructor/Pilot in Command; Lt Funcheon was assigned as Transition Pilot being checked; Cpl Millane was the assigned Crew Chief; Capt Plum was a pilot observer preparing for UH-1E instructor duties and had been verbally assigned to the flight by the Squadron Operations Officer.

2. Lt. Greenleese was an extremely well qualified helicopter pilot with 4327 helo hours, including 1,024 hours in the UH-1E. A five year summary is attached as encl (23). From 1 January - 14 April he flew 208.7 hours, of which 13 were instrument time (5 actual) and 24 were night time. During the week preceding the accident he had flown 18.1 hours, including 3.6 hours on the day of the accident.

Under normal flight conditions Lt. Greenleese was a very competent, professional aviator. He flew "by the book" and was known for his adherence to standardized procedures. He was a demanding instructor and pushed transition pilots to the limits of their capabilities but

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES



was very fair in his flight analysis and syllabus write-ups. This, coupled with his natural flying ability and meticulous attention to detail, made him one of the most respected instructors in the squadron.

Coping with unusual and demanding flight situations, however, did not come as easily to him. By his own admission he had less than average mechanical aptitude, which somewhat hampered his analysis of aircraft malfunctions. This assessment is borne out by material discussed on page 28.

3. Lt. Funcheon was designated a Naval Aviator 26 Oct 1966. His total flight summary is attached as encl (23). He had 172.7 helo hours with 97.2 hours in the UH-1E. From 1 January to 14 April he flew 97.2 hours of which 9.2 was instrument time (0.2 actual) and 17.2 was night time. During the week preceding the accident he had flown 7.6 hours, including 3.6 hours on the day of the accident. Lt. Funcheon was above average in the "stick and throttle" aspects of flying, with a lot of natural ability, but squadron instructors downgraded him somewhat for his chronic overconfidence.

4. Corporal MILLANE had been flying in the UH-1E for four months: 15-31 December as a non-crew member gunner, 1-15 January and 16-28 February as a crewmember under training, and 16 March-14 April as a designated crew chief. He was considered an average crew chief and mechanic.

5. Captain PLUM had joined the squadron five days prior to the accident, having just returned from Vietnam. He flew his last combat mission in Vietnam in a UH-1E on 20 March 1967 and joined WMO-5 on 10 April 1967. On 12 April he flew a 1.7 hour flight and on 13 April a 3.5 hour flight, both with the squadron operations officer, to familiarize himself with the squadron's standardization requirements. On 14 April he flew 1.3 hours to practice these procedures, then joined the PQM check to observe check procedures.

6. WMO-5 normally assigns an instructor and aircraft for multiple sorties for the accomplishment of a PQM check. The check pilot has full discretion as to the conduct of these flights within the guidelines established in the NATOPS Flight Manual as supplemented by squadron instructions. The non-tactical part of the flight evaluation (except for the instrument check) is normally given in the Camp Pendleton area. An instrument check is not required if the transition pilot received a "SATISFACTORY" at the conclusion of the instrument syllabus check flight (Lt Funcheon did), however the instrument flight phase is normally included on every PQM check to better evaluate the overall performance of the transition pilot. This flight usually terminates at other than home field. The tactical flight evaluation stresses initiative and aggressiveness by including both a pre-briefed mission and a mission assigned in the air by a "ground station" (the instructor). Both tactical missions normally require locating ground positions, using map coordinates, and making confined area landings,

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usually at higher elevations.

7. Lt Greenleese had been flying continually from Camp Pendleton since 2 July 1964. He was extremely familiar with the local flying area and on previous check flights was known to use landing sites in the Santa Ana Mountains northeast of El Toro (controlled by MCAF Santa Ana). On at least one recent check flight he used a landing site adjacent to the micro-wave station atop Santiago Peak. On that flight his approach was generally westerly, paralleling the high ridge line to the north of his flight path.

8. Part A of OPNAV Form 3760.2 (Yellow Sheet) was signed off by LCpl (b) (6) crew chief for the first phase of the POM check. He pre-flighted the aircraft by the pre-flight cards and strapped in 1500 pounds of weights (encl (24)). Limitations on the reference card attached to the yellow sheet were: "No HF (ARC 94 removed)" and "Slight leak on tac gen NF & NG (parts on order)."

9. Lt Funcheon signed off the acceptance portion of part A of the yellow sheets certifying he had inspected "ALL" previous discrepancy sheets. He conducted the pilot pre-flight and strapped in prior to Lt Greenleese arriving at the flight line (encl (24)).

10. UV-13 launched from Camp Pendleton at 0735 and operated locally in several areas in a check of normal procedures and confined area landings. The aircraft landed at home field at 0945, at which time it was refueled and the weights were removed (encl (24)).

11. In the debriefing for the flight in the ready room Lt Greenleese was overheard to compliment Lt Funcheon on a good first phase of the check. He indicated they would fly to Pt Vicente on an instrument phase and then fly a tactics portion east of El Toro as a third phase.

12. LCpl (b) (6) was replaced by Cpl Millane as crew chief on the second launch since UV-13 was not in his (b) (6) section. The regular crew chief for the aircraft, Cpl (b) (6) had been excused from flying that day to take care of some personal business (encl (25)).

13. The pre-flight of the aircraft for the second launch presumably was conducted by Cpl Millane, though no witness can attest to this. No new yellow sheet was filled out, but Cpl Millane added himself to the back of Part D. Capt Plum joined the flight as observer at this time and his name was added as a crew member on the front of Part D.

14. UV-13 departed Camp Pendleton at 1020 and terminated at 1118 at Pt Vicente Coast Guard Station (where Lt Greenleese had friends) and the crew ate lunch.

15. Personnel at Pt Vicente do not recall any mention of aircraft discrepancies by any of the four aircraft crew members.

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16. The pre-flight of the third phase was unobserved. Probable crew positions in the aircraft at takeoff from Pt Vicente (and as substantiated by crew positions in the wreckage) were: Lt Greenlee in the left cockpit seat; Lt Funchess in the right cockpit seat; Capt Plum in the left jump seat; Cpl Millane in the right jump seat. Both jump seats were facing forward (these seats are somewhat closer together than the pilot seats which allow both aft crew members a good view of the cockpit presentation).

17. The aircraft departed Pt Vicente at 1219 U, filing a flight plan airborne with Long Beach Approach Control at 1222, VFR Direct El Toro Direct Camp Pendleton. Estimated time enroute 1.5 hours. Fuel on board two hours (encl (26)). The El Toro weather was generally 2500 broken, high overcast, 10 miles visibility, winds 260/10, temperature 64, dew point 51 (encl (27)).

18. At 1226 UV-13 reported his position to Long Beach Approach Control as the 120° radial Los Angeles Tacan, 19 NM, heading 080° (encl (26)).

19. At 1228 UV-13 reported his position to Long Beach Approach Control as over Huntington Beach at 5500 feet (based on filed airspeed and existing wind, the board computed his position as slightly seaward of Huntington Beach). The aircraft requested and received permission to shift frequencies. This was the last known two way contact with the aircraft (encl (26)).

20. At 1229 Long Beach Approach Control established radar position of UV-13 and attempted to pass this information to the aircraft. There was no response, UV-13 evidently having shifted frequencies (encl (26)).

21. At 1245 the following transmission was made on 340.2 MCS (Navy Primary): "Mayday, Mayday, Mayday. Uniform Victor One Three (unkey), One Four miles south (end of transmission)." (encl (28)).

22. There was no known transmission on UHF Guard Channel (243.0 MCS) nor was there an "Emergency" IFF Squawk painted on radar.

23. At 1251, LtCol Tooker, Commanding Officer, VMO-5 was notified by Camp Pendleton tower of the Mayday transmission while he was airborne enroute to El Toro from Camp Pendleton. He assumed control as airborne search coordinator, directed four other airborne squadron aircraft to join him, and requested additional assistance from MHTG-30 at MCAF Santa Ana (encl (29)).

24. Because of the incomplete Mayday transmission, UV-13's position reference point was unknown, greatly increasing the area to be searched. Several erroneous "eyewitness" reports of a crash in the water off Huntington Beach were exhaustively checked out. Military and civilian agencies cooperated in the air/sea search coordinated by the Commanding Officer, MHTG-30 at MCAF Santa Ana.

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25. The search continued during daylight hours, with the El Toro SAR helicopter discovering the crash site at 1340 Sunday, 16 April (encl (30)). Search aircraft had, in fact, been in the immediate vicinity of the crash site within two hours after the accident, but the site had been obscured by cloud cover.

26. The WMO-5 Squadron Commander proceeded to the crash site and ascertained that all four crew members had been fatally injured in the crash and were still in the wreckage (encl (29)). Removal of the remains that day was prevented by darkness.

#### G. Analysis

1. Weather. Definite weather at the crash site at the time of the crash is unknown but can be generally calculated from the following:

a. The observation at El Toro, ten miles away, at 1258 was 2500 broken (6/10 coverage), high cirrus, visibility 10 miles, temperature 64, dew point 51, wind 260/10 (encl (27)).

b. Personnel at the micro-wave station atop Santiago Peak were uncertain as to the weather during this time but indicated that it was "not good".

c. MHTG-30 pilots using the CAL sites in the Santa Ana Mountains two hours prior to the accident reported the weather to be broken to overcast with bases variable around 4000 feet.

d. Two hours after the accident, search aircraft could not proceed higher than the 4000 foot level in the vicinity of the crash site (encl (29)).

e. The AAR board worked at the site during similar weather and observed very rapid and extensive cloud cover changes, with the bases varying at times from 3800 to 4500 feet in a matter of minutes; the visibility clear of clouds was always excellent. Though winds were generally westerly above the ridge lines, at the crash site they were light and variable from the southeast (upslope).

From the foregoing the probable weather in the area of the crash site at 1245U was variable 4000 foot broken with tops 5500 feet, visibility greater than 7 miles, winds westerly 10-15 kts above the high ridge line. The crash site itself was probably IFR with an estimated 1/16 mile visibility and winds light and variable from the southeast.

#### 2. UV-13: Operations and Maintenance Analysis

UV-13 was received by the squadron as a new aircraft on 6 July 1966. It flew a total of 216.2 flight hours through 30 September 1966. Enclosure (31) lists the flight time and maintenance record from 1 October 1966 through the accident on 14 April 1967 (6 1/2 calendar months).

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No significant trend could be determined from this record. A 50 hour check was conducted two days prior to the accident with nothing unusual noted. The following are general comments concerning items of particular interest in enclosure (31).

- a. Flight time: 1 Oct 1966 thru 14 Apr 1967: 489.1 Hours
- b. Flight time: 15 Mar 1967 thru 14 Apr 1967: 58.5 Hours
- c. Discrepancies/Corrections

(1) High temperature starts. All three high temperature starts listed occurred during October and November. The engine was replaced in December during a calendar even inspection.

(2) 1:1, 1:2 and lateral low frequency vibrations. The 1:1, in particular, is a common discrepancy in the 540 model UH-1E; the others are less common but not unusual. A high percentage of these low frequency vibrations were caused by a loose collet which is quite common in the 540 model and has been corrected in the revised 540 model with a new type collet. All low frequency vibrations were satisfactorily remedied as they occurred. The last one listed occurred on 30 March 1967.

(3) High frequency vibrations. These normally emanate from the engine or tail rotor. This occurred only two times, both times during January. On the second time the tail rotor hub was changed and the tail rotor balanced, which corrected the problem.

(4) High RPM/Overspeed. The three discrepancies listed were corrected on 27 December by rerigging the governor control.

(5) Control rod hitting mixing lever. One time discrepancy corrected on 15 February 1967.

d. Unincorporated airframe changes. All unincorporated airframe changes (encl (31)) are on order. AFC #7, Fixed Forward Firing Suppression Kit, was actually installed on UV-13 but had been removed from another aircraft to facilitate squadron training.

3. AAB Analysis of RADM/C DIR's. RADM/C at Corpus Christi completed ten separate DIR's under N. SCREPP/C control number 2409-67.

a. Overspeed Governor and Fuel Control

(1) Overspeed Governor. The preliminary DIR (encl (8) para 1) stated that the fly weight base assembly and pin assembly had failed and that complete analysis would be noted in the DIR to follow. The analysis of this item was delayed by breakdown of the electron microscope at RADM/C. On 25 May 1967 the AAB received enclosure (9) which states the failure was due to overstress.

AAB Comments: None

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(2) Fuel Control. The DIR for the fuel control has not been received due to the delay caused by the analysis of the overspeed governor. Enclosure (8), referring to the DIR on the fuel control and overspeed governor, mentions only the latter as having a failed part. Lt (b) (6) who accompanied the parts to ARADMAC, states that disassembly revealed no malfunction other than the overspeed governor fly weight. The fuel control was operating in the "Automatic" or normal position. The completed DIR will be submitted separately upon receipt.

b. Gas Turbine Engine DIR (enclosure (10))

ARADMAC comment (c): The power output cover and torquemeter were heavily damaged by impact (encl (4) of AAR encl (10)). Some of the mounting studs and spacers had been sheared from the power output cover (encl (5) of AAR encl (10)).

AAB comment: This indicates the engine moved forward and to the right, impacting on the fifth mount support. Damage on the right rear side of the fifth mount support matches the bolt spacing and damage done to the power output cover.

ARADMAC comment (s): Removal of the compressor housing halves revealed high speed machining on the top half of the axial compressor housing at the fourth and fifth stages only (encl (22)&(23) of AAR encl (10)). The centrifugal compressor housing revealed high speed machining and stationary impact marks.

AAB comment: The high speed machining indicates the engine was running at impact. The stationary impact marks have soot in them (encl (24) of AAR encl (10)) indicating that damage occurred after the post impact fire, probably when the engine was hoisted out of the crash site by hoist.

ARADMAC comment (t) (in part): The appearance of the axial compressor blades and centrifugal compressor vanes indicate an estimated RPM of approximately 55-60% of N1 speed (encl (26)&(28) of AAR encl (10)).

AAB comment: This indicates that the engine was probably operating at flight idle. The powerlever on the engine was found in a nearly wide open position at the crash site (page 7). This could be caused by the engine moving forward during impact even if the lever had been set at flight idle prior to impact.

ARADMAC conclusions: The engine was operating at the time of impact.

AAB comment: Concur.



c. Engine to Transmission Drive Shaft Assembly DIR (enclosure (11))

ARADMAC conclusions: Damage to the drive shaft was the result of ground impact forces.

AAR comment: Concur. /

d. Transmission DIR (encl (12))

ARADMAC comment (d): Marks were noted on the transmission case input quill mounting pad. The marks appear to have been made by the cooling fins on the forward end of the drive shaft (encl (4) of AAR encl (12)).

AAB comment: This indicates that the engine moved forward forcing the drive shaft and cooling fins into the input quill mounting pad.

ARADMAC comment (e): The broken teeth on the input drive bevel gear match with the marks on the input driven bevel gear. It is suspected that the driven gear shaft struck the drive gear teeth and shaft when the transmission main case disintegrated on impact.

AAB comment: This indicates the main transmission rotated forward and down as the case disintegrated during impact.

ARADMAC conclusion: Damage to the transmission was caused by ground impact forces or excessive heat from the post crash fire.

AAB comment: Concur.

e. Pylon Installation DIR (encl (13))

ARADMAC comment (f): Both stabilizer bars failed toward the white blade (encl (8) of AAR encl (13)). Fractures of the stabilizer bars were a result of bending overstress (encl (9) and (10) of AAR encl (13)).

AAB comment: This indicates the stabilizer bars failed toward the white blade when it first made contact at the 12 o'clock position during impact.

ARADMAC comment (g): The red and white blade damper control levers were bent opposite the direction of rotation indicating that the damper control tubes were still attached during the impact sequence (encl (11) and (14) of AAR encl (13)).

ARADMAC comment (h): The red and white blade control tubes were bent opposite the direction of rotation. Fractures on the control tubes were a result of bending overstress (encl (15) and (16) of AAR encl (13)).

AAB comments on (g) and (h): This indicates the control tubes were in good condition at impact and reduces the possibility of pre-impact failure or fouling by the hoist cable (as discussed on page 28).

ARADMAC comment (i): The white blade grip nut, P/N 540-011-177-1, had only minor damage, which was caused by the white blade butt swinging in the grip when the trailing edge of the blade failed in the drag link area on impact (encl (17) of AAR encl (13)).

ARADMAC comment (k): The red blade grip nut, P/N 540-011-117-1, was severely damaged by the red blade butt.

AAB comment on (i) and (k): This indicates that the red main rotor blade absorbed most of the energy of the rotor head at impact as the damage was much more severe to the red grip nut (and blade).

ARADMAC comment (t): The mast was distorted by contact with the yoke of the red blade side (encl (27) of AAR encl (13)).

AAB comment: This indicates the main rotor blades were not flapping excessively in flight as the damage was only on the red side.

ARADMAC conclusions: Damage noted on the pylon installation was a result of ground impact.

AAB comment: Concur.

f. Hydraulic Flight Controls DIR (encl (14))

ARADMAC conclusions: Damage to the controls was a result of ground impact forces and excessive heat from the post crash fire.

AAB comment: Concur.

g. Tail Rotor Drive Shaft DIR (encl (15))

ARADMAC conclusion: Damage to the shaft was a result of ground impact forces probably at the time of tail boom separation.

AAB comment: Concur.

h. 42° Gear Box DIR (encl (16))

ARADMAC comment (a) (last sentence): It is therefore evident that the tail rotor severed the drive shaft between the 42° and 90° gear boxes (encl (1) of AAR encl (16)).

AAB comment: Concur.

ARADMAC conclusions: No discrepancies were noted other than that caused by impact.

AAB comment: Concur.

i. 90° Gear Box DIR (encl (17)).

ARADMAC comment (b): There was no evidence of reverse loading or indication of engine compressor stall on the coast side of the input pinion gear or output bevel gear (encl (1) of AAR encl (17)).

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AAB comment: This indicates that there had been no compressor stall of the engine prior to impact.

ARADMAC comment (c): Runout on the output shaft at the slider spline measured 0.052. This condition indicates a heavy strike by one of the tail rotor blades.

AAB comment: This indication is supported by analysis of the damage to the vertical fin.

ARADMAC comment (e): The threads on the 90° gear box output shaft failed in shear when the static stop pounded the tail rotor yoke (encl (3) of AAR encl (17)).

AAB comment: Indications are that this happened during the impact sequence. Had it separated prior to impact the tail rotor would have separated from the aircraft and would not have been at the crash site. The aircraft would have been rotating violently with a resultant large wreckage dispersal. There is no evidence of section #5 of the tail rotor drive shaft turning more than 180° after it was first damaged. This further indicates that the rotor was attached at impact and that the threads failed during impact.

ARADMAC conclusions: Damaged parts were a result of ground impact forces.

AAB comment: Concur.

j. Tail Rotor Installation (encl (18))

ARADMAC comment (e): Removal of the bolts from the blades and blade grips revealed that the shear force on the red blade bolts was opposite that on the white blade bolts (encl (5) of AAR encl (18)).

AAB comment: This indicates sudden stoppage of the tail rotor.

ARADMAC comment (f): Examination of the hub assembly, P/N 204-011-701-13, revealed that the yoke had pounded against the static stop, P/N 204-010-774-11 (encl (6) of AAR encl (18)), causing the hub nut, P/N 204-010-719-1, to strip in the threaded area.

AAB comment: As discussed in paragraph i, 90° Gear Box DIR, indications are that this occurred during the impact sequence. Had it separated during flight, the tail rotor would have separated from the aircraft causing a violent rotation and subsequent large wreckage dispersion.

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ARADMAC comment (g): One bolt was missing from the crosshead, P/N 204-011-711-3 and slider, P/N 204-010-720-3 (encl (7) and (8) of AAR encl (18)). Examination of the outboard side of the crosshead revealed that the washer under the head of the bolt had contacted the crosshead several times (encl (9) of AAR encl (18)). Microscopic examination of the bolt hole in the crosshead revealed that impressions of threads from the bolt had been worn into the inboard side of the bolt hole (encl (10) of AAR encl (18)). Thread mark impressions were also noted in the bolt hole in the flange of the slider (encl (11) of AAR encl (18)).

AAB comment: The board disagrees with ARADMAC's analysis of the "washer marks." There is no apparent way the washer could move over to do this damage, even during failure. Investigation reveals that these marks were probably made by a 7/16" open end wrench as illustrated in encl (32). When the wrench is moved forward the lower edge rests exactly in the marks. When the wrench is placed on the other side it matches exactly with the marks there. This probably occurs when a nut is being put on with a ratchet and the 7/16" wrench is allowed to rest against the marks. The same marks were found in other aircraft crossheads, although not to the same degree. The "thread marks" ARADMAC noted as appearing in the crosshead and in the flange of the slide were also found in the opposite (unfailed) bolt holes in the crosshead and slider as well as in other aircraft in the squadron. The marks are not deemed significant in the accident.

ARADMAC conclusions: That the loss of bolt, P/N AN174-14A, and nut, P/N NAS679-A4, caused loss of the tail rotor control system. A loose slider would cause a high frequency vibration and inability to make normal turns because of improper blade angles.

AAB comments: The board feels that, although there is a good possibility that a loss of the crosshead and slider assembly nut/bolt could cause a high frequency vibration with attendant loss of some degree of tail rotor control, there is insufficient evidence to support ARADMAC's conclusion that the nut/bolt loss would cause "loss of the tail rotor control system". To the contrary, the results of the BHC dynamic tests (encl (19) as commented on below) indicate the possibility that no appreciable difficulty would result from loss of the nut/bolt.

4. Resume of Bell Helicopter Company Report (encl (19)). This report consists of three separate sections.

a. Wreckage Analysis. The basic letter in encl (19) contains the results of the investigation of wreckage parts at Camp Pendleton by a Project Engineer and a Metallurgist.

(1) BHC Conclusions: "The remaining parts (other than those sent to ARADMAC) revealed no fatigue or structural breaks that were the initiating cause of the accident, but several points were observed that may aid in the investigation". (Comments were also made on tail rotor component tests and are covered in paragraph c. below).

(2) AAB Comments: The two factory representatives had access to the total wreckage except for those components sent to ARADMAC. Investigation was conducted at a hangar lay-out of the parts concurrently with a AAB re-examination. The board concurs that nothing was discovered at Camp Pendleton that was a possible cause factor in the accident. Several facts commented on however, did aid in impact analysis:

(a) Indications of right skid at impact: Right forward bending of the cyclic control counter weight posts, fifth mount crushed on the right side (plus a lower right segment of the engine ~~was~~ broken away), the right mounting hole in the fifth mount support is elongated to the rear, and radios indicated impact at 20° right of the longitudinal axis.

(b) Indications of two impacts by the white main rotor blade supports the board's impact analysis.

b. Metallurgical. (Appendix A to encl (19)). This section of the report contains results of a visual analysis by a BHC metallurgist who observed the ARADMAC DIR's.

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(1) BHC Conclusions: "The parts received at ARADMAC were severely fire damaged and contained numerous fractures and items of secondary damage. All the fractures viewed appeared to be secondary static overload fractures, the result of ground impact. None of the components exhibited gross wear, corrosion, or evidence of malfunction which might have started an accident sequence."

(2) AAB Comments: The BHC metallurgist's observations and conclusions are consistent with those documented in the ARADMAC DIR's except concerning the crosshead. The Bell report comment on the crosshead was as follows: "One of the two bolts which secure the slider to the crosshead was missing. Because of dirt and fire damage, simple visual examination could not determine if the bolt had fractured on impact or had come out earlier. The ears on the crosshead were bent in a shallow "S" shape."

c. Tail Rotor Slider and Crosshead Tests (Appendix B to encl (19))

"In an effort to determine whether the loss of one of the two tail rotor slider to crosshead bolts could precipitate loss of the tail rotor, three separate tests were conducted. With one bolt missing, a static load-deflection test was performed to determine whether flight measured loads would produce deflections of sufficient magnitude to impair the operation of the tail rotor. A whirl test was conducted with one bolt loosened and then missing under various conditions of pitch, track, and rpm in an effort to excite a dynamic instability. Finally, a crosshead-slider assembly was loaded statically with all bolts installed and properly torqued to determine what component would fail first and at what pitch link load magnitude the failure would occur."

(1) BHC Conclusions (from para 6. of basic report): "As noted in the detailed test report the exact environment of the helicopter cannot be duplicated, and therefore the result of the test are not necessarily conclusive. However, the magnitude of the loads applied to cause the pitch change link to fail is so far above normal loads that it is assumed the damage must have occurred at impact."

(2) AAB comments: The board would agree that there is a definite possibility that the nut/bolt failure could have occurred on impact. However, even though the BHC whirl tests indicate there was little appreciable problem induced by removal of the bolt for the tests the board feels a 110 knot flight environment with its unpredictable and varying dynamic stresses could induce vibration and control problems. Under flight stress the loss or loosening of one nut/bolt on the crosshead and slider assembly possibly could induce separation of the crosshead and slider on the side of the missing/loose nut/bolt (see encl (8) to AAR encl (18)) resulting in an out-of-track condition and a high frequency vibration, with some loss of tail rotor control. This constantly changing out-of-track condition could cause the cross head to work back and forth about the flanged end of the slider, with the slider unable to follow due to its being splined securely to the drive shaft. This could possibly result in the slight "S" bend seen on the flange (encl 8 of AAR encl 18) (Neither ARADMAC nor Bell commented on this "S" bend).

Had the above condition existed in UV-13 the board feels it is probable that the pilot would still retain a large degree of tail rotor (directional) control and would attempt to land, with minimum power settings, as soon as possible.

5. Failure Analysis of Crosshead and Slider Assembly BOLT (AN 174-154) and Nut (NAS 679-A4). The nut/bolt unit definitely failed, however since the unit is missing it is impossible to determine which part failed.

(1) If the bolt failed it was most probably at impact due to localized stress beyond the design limitation, or to fatigue/material failure because of internal defects.

(2) If the nut failed it could have occurred under the same conditions as listed for bolt failure above, or it could have occurred airborne as a result of material failure, loss of self-locking properties through reuse or as the result of having been improperly torqued. Stress/material/fatigue failure cannot be checked since the nut is missing. The remaining factors are discussed below.

(a) Investigation within the Squadron Maintenance Section revealed that the nuts, although a self-locking one time usage item for this type installation, were possibly being re-used. Verbal statements to this effect were made by two different supervisory personnel from the maintenance department. Reuse of the nut is contrary to the policy promulgated by the squadron maintenance officer (encl (33)). When these nuts are installed they are torqued to 70-95 inch pounds (encl (33)). Subsequent to the accident the break away torque was checked on all crosshead and slider assemblies in VMO-5. All readings were between 70-95 inch pounds, except one which was 120 inch pounds (possibly explainable by a spot of rust or corrosion). The average reading, excepting the one overtorque, was 88 inch pounds.

(1) NA 01-110 HCA-2, MIMS for UH-1E, SECTION 7, Chapter 3, page 3-44 para 3-120, INSTALLATION-TAIL ROTOR HUB and BLADE ASSEMBLY, gives detailed instructions to follow for correct installation of the tail rotor. Sub-paragraph F covers securing the cross head and slider together as follows: "Align parts and install two bolts, with washers under heads, through crosshead, shim, retainer plate, and flange of slider. Secure with washers and nuts". There is no caution given concerning the reuse of self-locking nuts in either the disassembly or assembly procedures. There is no torque listed and there is no standard torque table in the MIMS.

(2) NAWEPS 01-14-8, TECHNICAL MANUAL FOR AIRCRAFT STRUCTURAL HARDWARE, Section 5, Page 5-1, Para 5-4 states, "New self-locking nuts will be used each time components are installed in critical areas throughout entire aircraft including all flight, engine, and fuel control linkage and attachments." The manual gives instructions in para 5-10 on how to check the nuts for reuse in noncritical areas as follows:

"Metal and nonmetallic insert type locking nuts 3/8 inch and smaller may be checked by the "Finger-tight" method. If a nut can be run down with the fingers after the locking feature engages the bolt or stud, indicating the locking friction does not exist, it should be replaced."

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(3) NAVWEPS 00-15PH-500, TECHNICAL INSPECTION MANUAL FOR AIRCRAFT COMPONENTS, VOLUME VIII, SECTION I, Para 4.h.2 (page 12) states "Self-locking nuts may be reused a maximum of fifteen times, provided examination shows them to be in acceptable condition." There is no information given on one time usage in critical areas or instructions for checking the nut for reuse.

(4) NAVWEPS 17-1-108, TECHNICAL MANUAL. USE, CARE, AND TESTING INSTRUCTIONS, TORQUE TOOLS; SECTION IV, page 4, para 4-6 references a table of standard torque values which is Table II of this manual. It explains that in most instances the torque will be obtained from a table, similar to Table II, in the general instruction section of the aircraft maintenance manual and that Table II is a standard table of recommended torque values for tightening different types of standard nuts. It further explains that Table II or its equivalent should be consulted for the correct torque value for any fastener that does not have a torque value specified in the assembly instructions. Table II is made up of five columns, with column one giving bolt diameter and threads per inch and the remaining four columns giving the proper torque under different combinations of tensile strength, shear type, tension type and other type nuts. The user must then determine the bolt diameter, threads per inch, tensile strength of bolt, and whether the nut is shear, tension or other type. This manual does not contain this information so the user must now go to the NAVWEPS 01-1A-8 and identify the bolt by the identifying marks on the bolt head. There is no determination as to shear or tension type nuts so the user must now determine what his particular application is.

(5) The bolt used in this installation is  $\frac{1}{4}$ " diameter, 28 threads per inch with a tensile strength of 125,000 PSI in a tension type installation. Following is a listing of torque values for this installation extracted from the indicated references.

NAVWEPS	17-1-108	50-70 inch pounds
NAVWEPS	00-15PH-500	50-70 inch pounds
NAVWEPS	01B-15AB-2	70-95 inch pounds
NAVWEPS	17-1-526	70-100 inch pounds

6. Instrumentation. Section VI lists instrumentation and avionics components with degree of damage.

a. No usable information with respect to engine, transmission or flight characteristics was derived from the recovered control units. Control units not recovered were: FM control, compass control, TACAN control, UHF control, and Low Frequency ADF control. No switch settings of any control were established from the recovered units.

b. The only avionics component which yielded possible useful information was the TACAN set. The RF module indicates a probable channel selection of either 58, 59, 60, or 61. The only local TACAN beacon utilizing a channel cited is the Ontario beacon, channel 59.

7. Safety and Survival Equipment. No protective equipment, either personal or in the aircraft, is designed to protect the user against the extreme forces that were encountered in the accident. All items of aircraft equipment appear to have functioned properly within design limitations (no reference to "G" limitations on the armored seats could be found).

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES



All occupants of the aircraft were properly equipped with personal safety and survival equipment except that parachutes were not carried since they were incompatible with the armored seats (see encl 34).

8. Cause Factors Analysis The wreckage was checked at the crash site and later in great detail at Camp Pendleton during two separate wreckage reconstructions on the hangar floor. The following general areas were considered, singly and in combination, in investigating and analyzing possible cause factors of the accident: a. engine malfunction; b. other component/system malfunctions; c. control malfunctions; d. fire in flight; and e. pilot factor.

a. Engine Malfunction. On the face of it this accident had strong indications of a classic engine failure. As discussed earlier however, the engine was operating normally ( 55-60% RPM at impact ) with the fuel control in the automatic (normal) position.

b. Other Component/Systems Failure. The prime suspect in this area is the failure of the rotor nut/bolt on the crosshead and slider assembly; this has been commented on in detail on page 22. All wreckage parts were checked for indications of fatigue failure/component malfunction. The board did not discover any evidence, nor is there any shown in the ARADMAC DIR's or the BHC report, that tends to show a component/system failure or malfunction prior to impact.

(1) Dual Hydraulic Failure. One item of particular interest was the possibility of a dual hydraulic control failure. At cruising airspeed two pilots should be able to control this malfunction, however with excessive power or attitude changes the situation might get out of hand. This would help explain a descent through a broken cloud layer in mountainous terrain and the steep impact attitude. The most probable malfunction that would result in a dual hydraulic failure would be a shearing of the common shaft that drives both hydraulic pumps from the transmission. ARADMAC found this shaft to be intact; they could deduce nothing from the two pumps, however, because of severe fire damage.

(2) Erroneous Warning System Indication. Due to the low noise level of the engine, the UH-1E has a low RPM warning light and horn installed to alert the pilot to a dangerous condition. This could easily be the first realized indication of engine failure. The warning system has inputs from both the engine and rotor tachometer generators and the failure of either will activate the system. The immediate pilot response is normally to lower collective and cross check the other instruments. Had this occurred just above a cloud layer there is a possibility the aircraft could go IFR prior to the pilot completing the instrument cross check. A subsequent attempt to descend through an area of increased visibility (thin spot) could have led to the crash. A tachometer generator failure can be neither confirmed nor denied since both units were almost entirely consumed in the post-impact fire.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

c. Control Malfunction. Again, as in b. above, no evidence (other than the missing tail rotor bolt) has been discovered to indicate a control malfunction. Items of particular interest in this area are:

(1) Synchronized elevator control failure. At the board's request BHC ran a computer study of the effects of malfunction of the synchronized elevator control. Their study indicated that, at 120 kts, an uncontrolled elevator would seek a new, but unpredictable, position. If the pilot acted abruptly to counteract the resultant aircraft movement he could induce a (severe) flapping motion in the main rotor blades. The aircraft would tend to porpoise, with a good probability that the main rotor blades would strike the tail boom. Wreckage analysis in this accident is completely contrary to this probable sequence. Additionally there was no evidence of any elevator control malfunction or damage other than that caused at impact.

(2) Engine cowling jamming main rotor dynamic components. There was no evidence of any scarring or jamming of main rotor components or cowling damage not attributed to impact stress.

(3) Flight controls jammed by a tool found at crash site. A pair of badly bent bolt cutters was found in the wreckage. The cutters are normally carried in the cabin during hoist hops to cut the hoist cable in an emergency if the explosive cable cutter malfunctions. The Material Laboratory at NAS North Island determined that they were bent during impact; there was no indication of their having been in the control system.

(4) Rotor jammed by hoist cable. The hoist hook was not found in the wreckage, indicating the possibility of an inadvertent cable reel-out and subsequent jamming of rotor components. This possibility was not borne out by the evidence: measurement of the remaining cable on the drum accounts for total normal length; the length of the cable unrolled from the drum is the normal length from the drum to the hook in the full up position. It is theorized that as the aircraft impacted, the heavy hoist motor and drum ripped free, jerking the cable through the hoist boom. The hook was stopped when it contacted the boom, was sheared off at the attachment point and was thrown clear of the immediate crash site. There was no indication of scarring or jamming in the main rotor components.

d. Fire In Flight. No evidence was found to indicate a fire in flight. A selective computer run by Naval Aviation Safety Center on UH-1E in-flight fires (encl (36)) was inconclusive in pointing out additional areas of investigation and analysis.

e. Pilot Factor.

(1) As discussed previously on page 13, Lt GREENLEESE was an extremely experienced and conscientious helicopter pilot and instructor, though somewhat lacking in mechanical aptitude. This is indicated by the following incidents which occurred within the preceeding year:

(a) During May 1966, at March AFB, the engine would not turn over and the starter got hot while attempting start on UH-1E. Lt GREENLEESE was not the pilot in command but was the more experienced of the two. The pilots allowed the starter to cool and again attempted to start. This time the engine started and the aircraft was returned to MCALF Camp Pendleton. After shutdown it was determined that the turbine blades were scoring and complete failure could occur at any time.

(b) During November 1966, while flying at MCALF Camp Pendleton Lt GREENLEESE experienced loss of one hydraulic boost system, which caused loss of the tail rotor boost. He immediately shut down the engine and executed a full autorotation to MCALF Camp Pendleton. (This is considered improper pilot response as the only effect of the loss of this system is heavier than normal control pressure on the rudder pedals).

(c) During November or December 1966 while flying over Ramona airstrip a pilot-passenger in the passenger compartment opened an overhead air vent and water that had accumulated in the vent sprayed in. The passenger was unfamiliar with the aircraft and shouted "fuel in the cockpit." Lt GREENLEESE shut down the engine and shot a full autorotation to Ramona (This is considered improper pilot response as the location of the fuel cells behind the passenger compartment makes the possibility of fuel entering the overhead air vent extremely remote).

(d) During March 1967 while flying at Laguna AAF Lt GREENLEESE, as instructor pilot, was demonstrating a practice autorotation. During the flare, and while still in a nose high attitude, the rear skids contacted the ground before the collective pitch was brought in. The subsequent hard landing caused the main rotor blade to flex down and strike the tail boom just forward of the 42° gear box and sever the tail rotor drive shaft. (VMO-5 Incident 5-671). (This incident is not indicative of lack of mechanical aptitude but does continue Lt GREENLEESE's recent series of incidents).

(2) A check of the above incidents, written examinations and instructional techniques indicate that Lt GREENLEESE's normal reaction to unusual/emergency circumstances in the cockpit was to autorotate and land as soon as possible. This, coupled with his complete familiarity with the area in which UV-13 crashed, might help to explain a decision to descend in mountainous terrain in marginal weather, if in fact there was a choice.

The NATOPS Flight Manual procedure for tail rotor failure and tail rotor control failure is to roll throttle off to flight idle and execute an autorotative landing. If a tail rotor malfunction did occur as described on page 24, it is possible that it was controllable but that Lt GREENLEESE, relying heavily on pre-planned procedures, executed an autorotation.

(3) During the flight prededing the accident Lt GREENLEESE deviated from proper procedure as follows:



(a) In filing a "VFR Direct" flight plan with Flight Service without explaining delay enroute to accomplish his local mission east of Santa Ana.

(b) In proceeding above 3000 feet terrain clearance (5500 feet over Huntington Beach) without parachutes. (Back pack parachutes are available in the squadron but they cannot be worn with the armored seat (encl (34))).

(c) In not checking in with MCAF Santa Ana tower which controls the area in which he was working and initiates search procedures for aircraft that are overdue.

(4) Lt FUNCHEON, as the pilot being checked, was probably at the controls when the accident sequence commenced. His known attitude of overconfidence might have led him to place the aircraft in a position that would become immediately untenable should even a minor malfunction occur. Lt GREENLEESE might have allowed this, in keeping with his known normal PQM check policy of pushing the transition pilot to the limit and allowing him to make his own mistakes.

The Mayday transmission was definitely broadcast by Lt FUNCHEON (as confirmed by close friends in the squadron). Though the tone of voice was strained and the tempo somewhat hurried there was no apparent panic, indicating to the board that an emergency situation existed but that it was under some semblance of control. There was no indication of an aircraft vibration or rotor beat in the voice. The transmission breaks off cleanly at the end of the phrase "one four miles south" which indicates voluntary unkeying rather than impact.

(5) At the time of the crash the two pilots had been flying sufficiently long (3.6 hours in a five hour period) to feel completely acclimated in the aircraft, yet not so long that they should have been unduly fatigued (both had received sufficient rest the night before and had eaten lunch at Pt. Vicente immediately prior to the flight).

9. Flight Profile and Emergency/Crash Sequence. (See Encl (2)). Although the flight profile and emergency/crash sequence of UV-13 cannot definitely be determined, the following possible sequence is consistent with known facts: UV-13 took off from Pt. Vicente at 1219U and climbed to its last known position just west of Huntington Beach at 5500 feet at 1228U. The aircraft proceeded across the El Toro control zone above a broken cloud layer at 5500 feet heading approximately 080° to attempt a practice Confined Area Landing at Santiago Peak. The top of the broken layer was higher towards the mountains, with just the top of the main peak visible. Ontario TACAN was selected as the preferred radio reference point. The flight continued at 5500 feet with Lt FUNCHEON at the controls, turning to pass to the south of the peak prior to making an approach along the ridge from the southeast. (This flight path places the aircraft approximately two miles south-southwest of Santiago Peak one to two

minutes prior to the Mayday call.) At this point a tail rotor crosshead and slider assembly nut/bolt failure occurs, resulting in a moderate high frequency vibration. Lt GREENLEESE now takes control of the aircraft, reduces power and airspeed to decrease the vibration while climbing slightly and attempts to analyze the malfunction. He commences an approach pattern that will allow him to make a precautionary landing at Santiago Peak from the southeast. The aircraft is now at 70 kts and 5800 feet (104 feet above peak elevation) 14 miles south of Ontario TACAN (channel 59). Because of the progressive increase in the severity of the vibration with partial loss of tail rotor control, Lt GREENLEESE decides he cannot make a successful landing at the rather restricted peak site. He reduces power to make a flight idle autorotation through a hole in the broken cloud layer, intending to land at the first suitable site. He tells Lt FUNCHEON to broadcast a Mayday. Lt FUNCHEON attempts to switch to Guard channel on the UHF radio and by mistake gets Channel One (Navy primary 340.2 MCS, a frequency not normally used in the local area). He broadcasts "Mayday, Mayday, Mayday, Uniform Victor One Three", then unkeys to check his position. The aircraft is now descending in a left hand turn with a 2000 feet per minute rate of descent. Lt FUNCHEON broadcasts "one-four miles south" and cannot remember the name of the TACAN that is selected. The aircraft goes IFR and Lt GREENLEESE goes on instruments, bringing his scan inside the cockpit. Lt FUNCHEON gives up on the radio call since he doesn't know what else to say and is more interested in what is going on in the cockpit. Neither pilot thinks to switch to IFF "Emergency".

The aircraft is now at 4600 feet heading generally northwest, still in an instrument autorotation and turning gently left. Then Lt GREENLEESE sees the mountain side immediately ahead. He attempts a hard left turn to go down slope to the southeast, banking 60° to the left and nosing down for a short turn radius. He attempts to pull the nose through with aft cyclic and applies some up collective. The aircraft almost completes its turn down slope, but without power cannot completely stop the original direction of travel and is rushing slightly. The rotor RPM has decreased, the nose position is steep (45-50° to the slope) and tucking further, descent speed is high and ground speed is very slow as the white blade strikes the ground a glancing blow at the 12 o'clock position, commencing the impact sequence described in section VI. Total elapsed time from 5800 feet to impact at 4400 feet is approximately 30 seconds.

The above flight profile and emergency/crash sequence could also be correct for any malfunction that would cause the pilot to enter an autorotation while still retaining a large degree of aircraft control.

10. Radar Altimeter. Flying a UH-1E above a broken or overcast cloud layer in mountainous terrain leaves little margin for error when an emergency occurs. It is possible that the tragic results of this accident could have been averted, once the emergency occurred, had the pilot been able to determine his altitude above terrain during the ensuing autorotation. At the very least it could have allowed him to slow his rate of descent while still in instrument conditions and prior to impact.

11. Parachutes. It is possible that lack of parachutes contributed to the fatalities in this accident, most particularly of the two aft crew members. Back-pack parachutes are available in the squadron, however they are incompatible with the UH-1E (pilot) armored seat (see encl 34); no crew member was wearing one.

12. NATOPS

a. There was no known NATOPS requirement or procedure that was a factor in the accident.

b. The NATOPS Manual was being complied with except that during the flight preceding the accident the aircraft exceeded 3,000 feet terrain clearance without parachutes.

c. Nothing in this accident indicates a need for a change in the NATOPS Manual.



## PART VIII CONCLUSIONS

The board concluded:

1. That the cause of the accident cannot be determined.
2. That the most probable cause was an airborne malfunction, possibly a failure of a nut/bolt in the tail rotor crosshead and slider assembly, which precipitated emergency procedures.
3. That weather probably was a contributing factor.
4. That the Maintenance Manuals are incomplete, confusing, and conflicting concerning self-locking nuts and required torque values.
5. That the squadron maintenance department did not properly ensure compliance with the policy prohibiting reuse of self-locking nuts in critical areas.
6. That the seriousness of the accident might have been lessened had a radar altimeter installation been in the aircraft.
7. That no known parachute is suitable for use with the UH-1E armored seat.
8. That proper flight filing, RIO procedures, and use of IFF "Emergency" would have expedited discovery of the crash site.

## PART IX RECOMMENDATIONS

The board recommends:

1. That further dynamic testing of UH-1E tail rotor components be conducted to better determine the effect of various component failures.
2. That the self locking nut NAS 679-A4 be replaced in critical areas throughout the aircraft (including all flight, engine, and fuel control linkages and attachments) with the castellated nut with self-locking insert MS 17825 series.
3. That until such time as the self-locking nut NAS 679-A4 is no longer used in critical areas, the nut be designated a one time usage item regardless of installation.
4. That standard torque tables be included in NA 01-110HCA-2 Maintenance Manual for UH-1E Aircraft and that specific torque values be listed for nuts/bolts in critical areas.
5. That existing maintenance reference manuals be standardized.
6. That the squadron maintenance department re-emphasize, for all personnel, the correct maintenance procedures for critical areas and that an aggressive and continuing program of training and quality control be prosecuted.
7. That a radar altimeter be installed in all UH-1E aircraft.
8. That a suitable parachute egress procedure be devised for use with the UH-1E armored seat.
9. That continued emphasis be placed on the necessity for correct flight filing, and RIO procedures, and on the importance of switching to IFF "Emergency" when in difficulty.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

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7. Aircraft Component History
8. Preliminary DIR 43G
9. Preliminary Overspeed Governor DIR MSG
10. Gas Turbine Engine DIR
11. Engine to XMSN Drive Shaft Assy DIR
12. Transmission DIR
13. Pylon Installation DIR
14. Hydraulic Flight Control DIR
15. Tail Rotor Drive Shaft DIR
16. 42° Gear Box DIR
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22. Flight Schedule 14 April 1967
23. Resume of Pilots' Flying Experience
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26. Transcript of Radio Transmissions with Long Beach Approach Control
27. Aircraft Emergency/Accident Data Form (Weather)
28. Transcription of Mayday Transmission
29. Statement of LtCol. (b) (6)
30. Rescue Report
31. Aircraft Operations and Maintenance Summary
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VMO-5, AAR 1-67A, of 14 APRIL 1967, UH-1E BUINO 152437, PILOT GREENLEESE  
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES



ENCLOSURE /

MEDICAL OFFICER'S REPORT  
NO AVAILABLE AT TIME OF FILMING

COULD NOT BE FOUND

70 4/2  
HEADQUARTERS  
MARINE OBSERVATION SQUADRON 5  
MAG-56, 3dMAW, FMFPac  
MCALF, Camp Pendleton, California 92055

MRV:jlv  
3750  
11 August 1967

FIRST SUPPLEMENTARY REPORT ON VMO-5 MOR 1-67A, UH-1E BuNo 152437,  
PILOT GREENLEESE, OF 14 APRIL 1967

From: Commanding Officer  
To: Commander, Naval Aviation Safety Center, Naval Air Station,  
Norfolk, Virginia 23511 (Attn: Aero-Medical Department)

Subj: First Supplementary report to VMO-5 MOR 1-67A, 14 April 1967,  
UH-1E BuNo 152437, PILOT GREENLEESE

Encl: Toxicologic and Histologic tests, results of

1. Enclosure (1) is forwarded for information. This is additional negative information which was not available at the time MOR 1-67A was Submitted. The comments of the investigating Medical Officer are included.

(b) (6)

By direction

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES.

MARINE OBSERVATION SQUADRON FIVE  
MAG-56, 3d MAW, FMFPac  
MCALF, CAMP PENDLETON, CALIFORNIA 92055

NOR 1-67A  
UH-1E, BuNo 152437  
14 April 1967

SUPPLEMENTARY REPORT

RESULTS OF:  
TOXICOLOGIC AND HISTOLOGIC TESTS ON THE FOLLOWING:

PLUM, Harold E., Capt. USMC (b) (6) OBSERVER  
GREENLEESE, William E., 1stLt USMC, (b) (6) PILOT  
FUNCHEON, Edward J., 2ndLt USMC, (b) (6) COPILOT  
MILLANE, Richard D., CPL USMC, (b) (6) CREW CHIEF

*Certified a true copy*

(b) (6)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV-  
INST 3750.5 SERIES.

Enclosure (1)



SUPPLEMENTARY REPORT for MOR 1-67A of VMO-5 14 April 1967,  
UH-1E BuNo 152437. Pilot GREENBERG

1. TOXICOLOGIC TESTS: Were performed on all occupants of the involved aircraft.

a. Tests were done on whatever specimens were available.

b. All of the test results are non-significant. They tended to rule out the factors of: drugs, in-flight fire, alcohol.

2. HISTOLOGIC TESTS:

a. Lungs of all crew members showed (b) (6)  
(b) (6) In view of the lack of evidence for in-flight fire, this (b) (6) is felt related to severe deceleration.

3. The causes of death remain the same.

4. The conclusions of the MOR remain unchanged.

(b) (6)

LT MC USNR  
Investigating flight surgeon

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST  
3750.6 SERIES.

-1-

Enclosure (1)

*Certified as true copy*

(b) (6)

TOXICOLOGY RESULTS SUMMARIZED

B L O O D

TEST

SUBJECT

RESULTS

Alcohol and other volatiles  
Alcohol and other volatiles  
Acid, basic, and neutral drugs  
Carboxyhemoglobin  
Carboxyhemoglobin  
Carboxyhemoglobin  
Carboxyhemoglobin  
Carboxyhemoglobin

(b) (6)

T I S S U E

TEST

SUBJECT

RESULTS

Alcohol and other volatiles  
Alcohol and other volatiles  
Acid, basic, and neutral drugs  
Acid, basic, and neutral drugs  
Acid, basic, and neutral drugs

(b) (6)

U R I N E

TEST

SUBJECT

RESULTS

Spot tests for drugs  
Sugar  
Acetone  
Acid, basic, and neutral drugs

(b) (6)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6  
SERIES.

Enclosure (1)

*Certified a True Copy*

(b) (6)

INVESTIGATOR

Eatherton

TOXICOLOGY REPORT  
CORONER'S OFFICE  
ORANGE COUNTY, CALIFORNIA

NAME OF DECEASED: PLUM, Harold Elihu AGE: 31 SEX: Male

DATE AND HOUR OF DEATH: 4/14/67 12:45 p.m.

MATERIAL SUBMITTED (UNEMBALMED): Blood

CHAIN OF POSSESSION: Dr. Richards, Forester, Eatherton, Blood Locker,  
Baselt

DATE AND HOUR SUBMITTED TO TOXICOLOGY LAB: 4/18/67 8:00 a.m.

OBSERVATIONS AND TESTS:

(b) (6)

CONCLUSIONS:

No significant toxicological material found in sample submitted.

DISPOSITION OF MATERIAL Refrigerator

LR NO. C67-172

DATE OF REPORT 4/25/67

EXAMINER: Robert H. Cravey

ROBERT H. CRAVEY  
CHIEF TOXICOLOGIST

*Certified a true copy*

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH CPRAVINGST 3750.6 SERIES

(b) (6)



HISTOLOGY REPORT  
CORONER'S OFFICE  
Orange County, California

NO.

OF 2202

NAME: PLIM, Harold Elihu

DATE OF DEATH: 4-14-67  
DATE OF AUTOPSY: 4-17-67

MICROSCOPIC:

(b) (6)

CAUSE OF DEATH: Remains the same.

RGR:mas

*Certified a true copy*

(b) (6)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH CPRA/VEIST 3750.6 SERIES

*L. G. Richardson*

TOXICOLOGY REPORT  
CORONER'S OFFICE  
ORANGE COUNTY, CALIFORNIANAME OF DECEASED: GREENLEESE, William Ernest - AGE: 35 SEX: MaleDATE AND HOUR OF DEATH: 4/14/67 12:45 p.m.MATERIAL SUBMITTED (UNEMBALMED): Brain, Liver, Spleen, KidneyCHAIN OF POSSESSION: Dr. Richards, Forrester, Eatherton, Freezer,DATE AND HOUR SUBMITTED TO TOXICOLOGY LAB: 4/18/67 8:00 a.m.

## OBSERVATIONS AND TESTS:

(b) (6)

## CONCLUSIONS:

No significant toxicological material was found in the specimens submitted.

## DISPOSITION OF MATERIAL Refrigerator

LR NO. C67-169DATE OF REPORT 4/25/67EXAMINER: Robert H. CraveyROBERT H. CRAVEY  
CHIEF TOXICOLOGIST*Certified a true copy*

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH ORANGE COUNTY 3730.6 SERIES

(b) (6)

NO. 67-1179 PKC

HISTOLOGY REPORT  
CORONER'S OFFICE  
Orange County, California

NAME: GREENLEESE, William Ernest

DATE OF DEATH: 4-14-67

DATE OF AUTOPSY: 4-14-67

MICROSCOPIC:

(b) (6)

RGR:ms

Certified a true copy  
*[Signature]*  
(b) (6)



INVESTIGATOR

Eatherton

NO. 67-1178

TOXICOLOGY REPORT  
CORONER'S OFFICE  
ORANGE COUNTY, CALIFORNIANAME OF DECEASED: PUNCHEON, Jr., Edward Joseph AGE: 20 SEX: MaleDATE AND HOUR OF DEATH: 4/14/67 12:45 p.m.MATERIAL SUBMITTED (UNEMBALMED): Blood, Liver, Urine, Kidney, Spinal  
Cord, Lung, SpleenCHAIN OF POSSESSION: Dr. Richards, Forrester, Eatherton, Freezer, BaseltDATE AND HOUR SUBMITTED TO TOXICOLOGY LAB: 4/18/67 8:00 a.m.

## OBSERVATIONS AND TESTS:

(b) (6)

## CONCLUSIONS:

No significant toxicological material was found in the specimens submitted.

DISPOSITION OF MATERIAL FreezerLR NO. 7-171DATE OF REPORT 4/25/67

EXAMINER:

Robert H. Cravey  
ROBERT H. CRAVEY  
CHIEF TOXICOLOGISTCertified a true copy

(b) (6)

HISTOLOGY REPORT  
CORONER'S OFFICE  
Orange County, California

NO.

67-1178

NAME: PUNCHION, Edward Joseph, Jr.

DATE OF DEATH: 4-14-67

DATE OF AUTOPSY: 4-17-67

MICROSCOPIC:

(b) (6)

CAUSE OF DEATH: Remains the same.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

RGR:ms

*Certified a true copy*

(b) (6)

*[Signature]*

INVESTIGATOR

Eatherton

NO. 67-1180

TOXICOLOGY REPORT  
CORONER'S OFFICE  
ORANGE COUNTY, CALIFORNIANAME OF DECEASED: MILLANE, Richard Daniel AGE: 19 SEX: MaleDATE AND HOUR OF DEATH: 4/14/67 12:45 p.m.MATERIAL SUBMITTED (UNEMBALMED): Liver, Lung, KidneyCHAIN OF POSSESSION: Dr. Richards, Forrester, Eatherton, Freezer,DATE AND HOUR SUBMITTED TO TOXICOLOGY LAB: 4/18/67 8:00 a.m.

OBSERVATIONS AND TESTS:

(b) (6)

## CONCLUSIONS:

No significant toxicological material was found in the specimens submitted.

DISPOSITION OF MATERIAL FreezerLR NO. 67-170DATE OF REPORT 4/25/67

EXAMINER:

*certified a true copy*  
Robert H. Cravey  
ROBERT H. CRAVEY  
CHIEF TOXICOLOGIST

(b) (6)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES



HISTOLOGY REPORT  
CORONER'S OFFICE  
Orange County, California

NO. 07-1100

NAME: Richard Daniel

DATE OF DEATH: 4-14-67  
DATE OF AUTOPSY: 4-17-67

MICROSCOPIC:

(b) (6)

CAUSE OF DEATH: Remains the same.

RCR:ms

*Certified a true copy*

(b) (6)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH CP-NAVINST 3750.6 SERIES 3

*L. L. Richards*

(b)  
(6)

CERTIFIED TRUE COPY

ENCLOSURE 2

LEGEND

- A. 1219Z OFF POINT VICINITY. FUEL 3400. WEIGHT 7750
  - B. 1225Z POSITION REPORT. 120° 19 MILES ON 85. BEARING 080°
  - C. 1228Z ESTIMATED POSITION FROM POINT B  
(PILOT REPORTED HUNTINGTON BEACH AT 5900 FEET)
  - D. 1230Z CRASH SITE. 6600 FOOT LEVEL. SANTIAGO PEAK. 060° 10 MILES  
ON 37. 140° 13 MILES ON 50. FUEL 1494. WEIGHT 7120
  - E. LIGHT AIRCRAFT WOULD HAVE REACHED AT 1245Z FLIGHT 080°, 110 KTS  
5900 FEET WITH 200° & 8 KNOT WIND FROM POINT B
- KNOWN FLIGHT PATH  
- - - - - ESTIMATED FLIGHT PATH TO CRASH  
- - - - - FLIGHT PATH AND AIRCRAFT CONTINUED ON  
▲ SANTIAGO PEAK ELEVATION 1094 FEET  
SCALE 1 : 250,000 COURTESY INTERNAL - 2000 FEET

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPERATING.  
7750.6 LBS.  
WD-3 AAB-1-076, 14 APRIL 1967  
ED-12, Ref. 152497, Pilot GENERAL





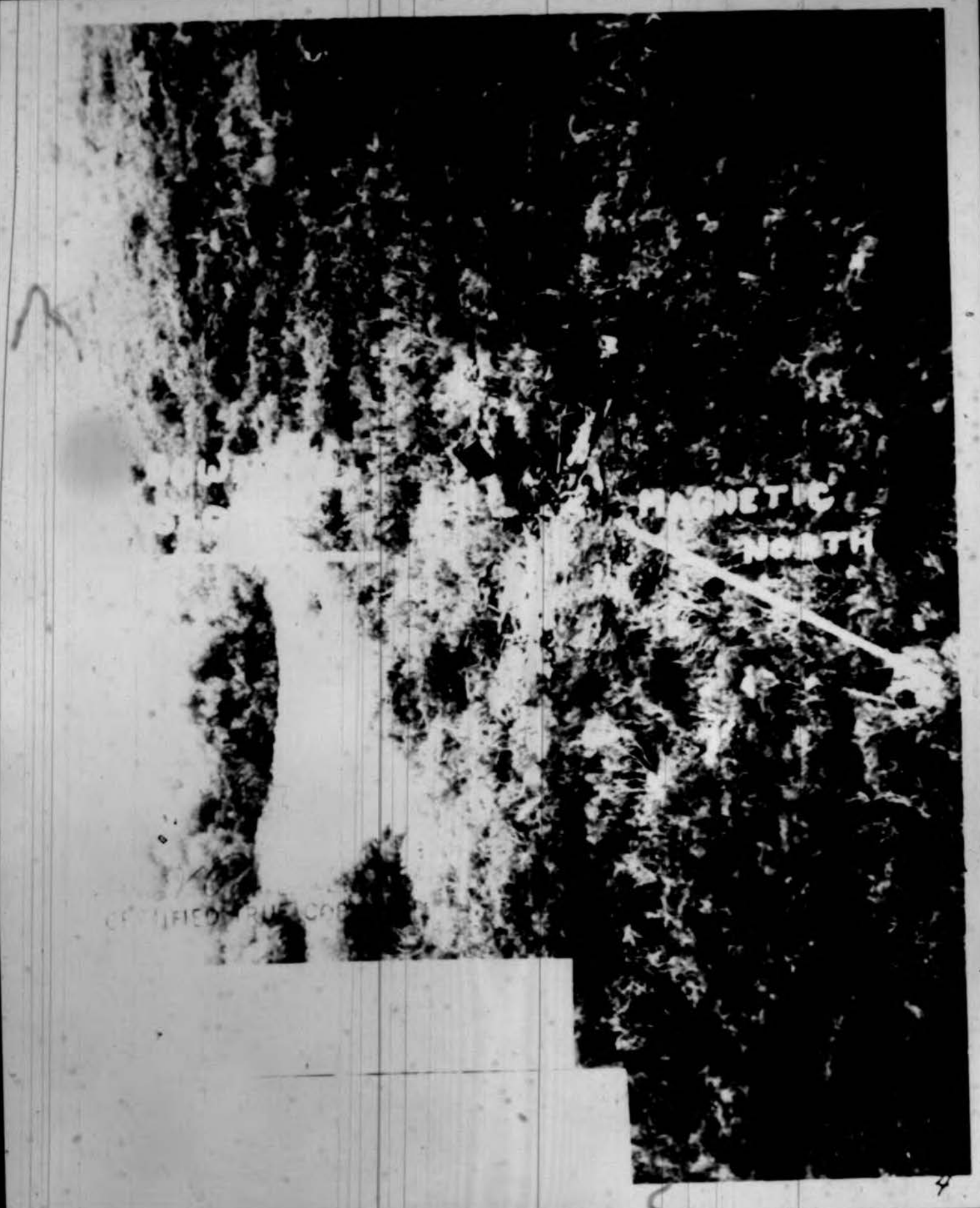
ASBESTIC  
PORTN

DOWN  
SHORE

(b) (6)

CERTIFIED TRUE COPY



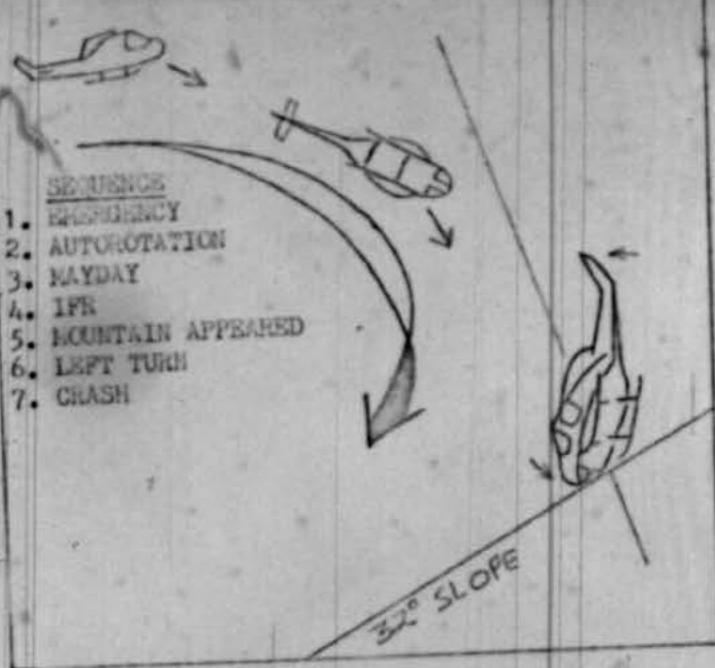


MAGNETIC  
NORTH

CERTIFIED TRUE COPY

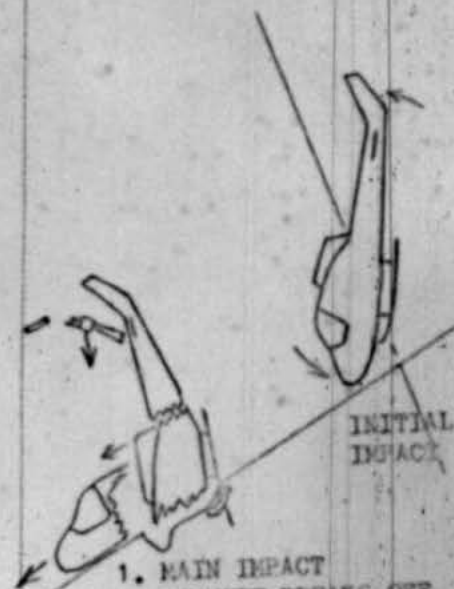
WFO-5 AAR 1-67A, of 14 APRIL 1967, UH-1H 152437, PILOT ORIGINATOR  
 SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH GENAVINST 3750.6 SERIES"

- SEQUENCE
1. EMERGENCY
  2. AUTOROTATION
  3. MAYDAY
  4. IFR
  5. MOUNTAIN APPEARED
  6. LEFT TURN
  7. CRASH



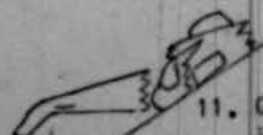
IMPACT SEQUENCE SKETCH

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 (b) (6)  
 ENCLOSURE (5)



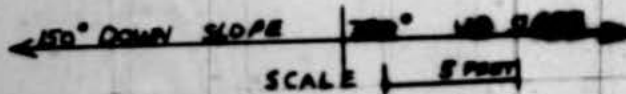
1. MAIN IMPACT
2. COCKPIT BREAKS OFF
3. SKIDS AND MAIN FUSELAGE BEAM 14 BURY INTO SLOPE
4. TAIL PYLON STARTS TO TEAR
5. TAIL ROTOR TEARS OUT

6. DEEP IMPACT HOLE (AREA A ON WRECKAGE DIAGRAM)
7. COCKPIT SLIDES DOWN SLOPE
8. ENGINE RIPS OUT AND COMES TO REST BESIDE COCKPIT
9. TAIL PYLON FLIPS OVER FUSELAGE
10. REMAINING FUSELAGE SLIDES DOWN SLOPE



11. COCKPIT, ENGINE AND FUSELAGE COME TO REST IN SAME AREA AND INTENSE FIRE ENVELOPS AREA (AREA B ON WRECKAGE DIAGRAM)
12. TAIL PYLON COMES TO REST JUST OUTSIDE FIRE

(b) (6)



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPERATING.  
3750.6 SINKING.  
VMD-5 AAB-1-67A, 14 April 1967  
UN-1B, BuNo. 152477, Pilot ~~CHAS. H. HARRIS~~



# WRECKAGE DIAGRAM LEGEND

1. FRONT SECTION OF RIGHT LANDING SKID, 25 INCHES LONG IMPACTED 175°.
2. FRONT SECTION OF LEFT LANDING SKID, 27 INCHES LONG IMPACTED 175°.
3. LOWER ANGLE BEAM 14 LEFT, STARTING STATION 80.50 BURIED 27 INCHES.  
LOWER ANGLE BEAM 14 RIGHT, BURIED 24.5 INCHES.  
UHF/ADF ANTENNA COVER FRAGMENT.
4. FM ANTENNA.
5. FORWARD AVIONICS DOOR FRAGMENTS.
6. SEARCH LIGHT.
7. 90° GEAR BOX.  
TAIL ROTOR ASSEMBLY.  
RESCUE HOIST BOOM.  
STABILIZER BAR RETAINING ROD.
8. CREWCHIEF HARD HAT FRAGMENTS.
9. SHORT SHAFT.
10. MAIN INPUT QUILL.
11. VERTICAL SPEED INDICATOR.
12. WHITE MAIN ROTOR BLADE TIP GOUGE 248°, 3 FEET LONG.
13. RED MAIN ROTOR BLADE GOUGE 265°, 12 FEET LONG.
14. RED AND WHITE MAIN ROTOR BLADE TIP WEIGHTS.
15. WHITE MAIN ROTOR BLADE.
16. TAIL ROTOR DRIVE SHAFT TOP COVER.  
TAIL ROTOR DRIVE SHAFT SECTION #2.
17. AFT AVIONICS ACCESS DOOR.  
RIGHT CARGO DOOR.
18. HOIST.  
ENGINE COWLING FRAGMENTS.

VID-5 AAR 1-67A, of 14 APRIL 1967, UH-1B BUINO 152437, PILOT GREENLEAF  
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

19. RED STABILIZER BAR.
20. CYCLIC PARTS.
21. LEFT GUN SIGHT.
22. TOOLS.
23. CREW CHIEF.
24. CO-PILOT SEAT.
- 24a. OBSERVER UNDERNEATH SEAT.
25. PILOT SEAT (PILOT IN SEAT).
26. CO-PILOT.
27. TRANSMISSION.
28. RIGHT COLLECTIVE.
29. NOSE COMPARTMENT RADIOS.
30. LEFT FUEL CELL.
31. WHITE STABILIZER BAR.
32. TAILPIPE AND ENGINE FIREWALL ASSEMBLY.
33. ENGINE.
34. BATTERY.
35. TAIL BOOM.
36. HEATER COWLING.  
ROTOR BRAKE.  
TRANSMISSION MOUNTS (2).
37. RIGHT GUN MOUNT.
38. LEFT SKID ASSEMBLY.  
RIGHT SKID.  
CYCLIC STICK MOUNT BRACKET.
39. LEFT GUN MOUNT.

WAS-5 BAR 1-67A, of 14 APRIL 1967, UH-1E BUINO 152437, PILOT GREENLEES  
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH CFNAV INST 3750.6 SERIES

40. HYDRAULIC MODULE.
41. PART OF RED MAIN ROTOR BLADE.
42. WHITE TAIL ROTOR BLADE.
43. MICROPHONE AMPLIFIER (HEADSET).
44. SECTION OF RED MAIN ROTOR BLADE LEADING EDGE, 8 FEET 6 INCHES LONG (1150; 250 FEET).
45. SECTION OF RED MAIN ROTOR BLADE LEADING EDGE (120°; 150 FEET).
46. AFT EDGE OF MAIN SPAR OF RED MAIN ROTOR BLADE (1100; 100 FEET).

DETAIL A. DEEP HOLE WITHIN MAIN IMPACT AREA.

1. CLEANING PORTS FOR RIGHT AND LEFT NOSE BUBBLE SECTIONS.
2. HARD HAT FRAGMENTS.
3. SECTION OF CENTER WIND SCREEN POST.
4. RETAINING HOOKS FOR PASSENGER SEATS, STATION 123.
5. CIRCUIT BREAKER PANEL FRAGMENTS.
6. PEDESTAL PANEL FRAGMENTS.
7. SECONDARY LIGHTS.
8. RPM WARNING LIGHT COVER.
9. PENCIL AND BALL POINT PEN PARTS.
10. MICROPHONE FRAME AND CORD PIECES.
11. NUMBER 6 TRANSMISSION OIL JET.
12. PILOT EMERGENCY EXIT HANDLE.
13. INSTRUMENT PANEL SPACERS.
14. TRANSMISSION HOUSING FRAGMENTS.

VNO - 1-67A, of 14 APRIL 1967, UH-1E BUNO 152437, PILOT GREENLEESE  
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES



DETAIL B. FUSELAGE AND INTENSE FIRE AREA.

1. PEDESTAL PANEL WIRING.
2. INSTRUMENT-PANEL FRAGMENTS.  
INSTRUMENTS.
3. PITOT TUBE.
4. HYDRAULIC MODULE.
5. IFF ANTENNA.
6. CARGO HOOK AND SUPPORT SPRINGS.
7. WINDSHIELD WIPER ASSEMBLY.
8. FIRE EXTINGUISHER.
9. PILOT SEAT RAIL FRAGMENTS.
10. FIRST AID KIT ARTICLES.

FIRE PATTERN: DASHED LINE - - - - -

DRIP PATTERN: DOTTED LINE . . . . .

VMO-5 AAR 1-67A, of 14 APRIL 1967, UH-1E BUONO 152437, PILOT GREENLEESE  
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH CPNAV INST 3750.6 SERIES

AIRCRAFT COMPONENT HISTORY UV-13 BUNO 152437  
(COMPONENTS SENT TO ARADMAC)

Nomenclature	Manufacturers Part Number	Total Hours On Part	Number of Overhauls	Hours Since Last Overhaul	Overhaul Activity
1. Gas Turbine Engine	T53-L-11	966.7	1	523.3	ARADMAC
2. Main Drive-Shaft Assy	204-040-010-7	536.9	NONE	NA	NA
3. Transmission	204-040-009-55	536.9	NONE	NA	NA
4. Collective Lever Assy 2 ea.	540-011-454-5	536.9	NONE	NA	NA
5. Swashplate Assy	540-011-450-3	65.9	NONE	NA	NA
6. Scissors and Sleeve Assy	540-011-451-1	536.9	NONE	NA	NA
7. Main Rotor Mast	204-040-366-11	536.9	NONE	NA	NA
8. Main Rotor Hub	540-011-101-3	536.9	NONE	NA	NA
9. Stabilizer Bar	540-011-300-7	181.7	NONE	NA	NA
10. Main Rotor Blade 2 ea.	540-011-001-5	536.9	NONE	NA	NA
11. Tail Rotor Shaft Assy	204-040-620-3	536.9	NONE	NA	NA
12. 42° Gear Box	204-040-003-37	536.9	NONE	NA	NA
13. 90° Gear Box	204-040-012-13	536.9	NONE	NA	NA
14. Tail Rotor Hub Assy	204-011-701-13	146.9	NONE	NA	NA
15. Tail Rotor Blades 2ea.	204-011-702-17	536.9	NONE	NA	NA

(b) (6)

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SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES  
VMO-5 AAR 1-67A, of 14 APRIL 1967, UH-1E BUNO 152437, PILOT GREENLESE

ENCLOSURE (7)





PAGE 2 FURTHERMORE UNCLAS

G. 42 DEGREE GEAR BOX: NEGATIVE

H. 90 DEGREE GEAR BOX: NEGATIVE

I. TAIL ROTOR DRIVE SHAFT: NEGATIVE

J. TAIL ROTOR BLADE AND HUB ASSY: IT WAS EVIDENT THAT THE

TAIL ROTOR BLADES STRUCK THE VERTICAL FIN AND TAIL ROTOR DRIVE SHAFT  
BETWEEN THE 42 DEGREE AND 90 DEGREE GEAR BOXES. THE TAIL ROTOR HUB  
POUNDED THE STATIC STOP CAUSING THE TAIL ROTOR HUB MFT THREADS TO FAIL IN  
SHEAR.

K. TAIL ROTOR FITCH, CROSS LINKS AND OVERSPEED ASSY: EXAMINATION  
REVEALED ONE BOLT WAS MISSING AND WAS NOT RECORDED IN THE  
INVESTIGATION FROM THE CROSSLINK ASSY. THE CROSSLINK ASSY AND TAIL ROTOR  
SLIDER P/N 100-610-725-1. THE CROSSLINK ASSY WAS DAMAGED BY THE THERMAL SECTION  
OF THE BOLT. BOLT AND ASSY BEING NOTED IN THE BOLT HOLD INDICATE  
THE BOLT WAS MISSING AT THE TIME OF THE FIRST CRASH FIRE. THE BOLT  
P/N WAS 1344-1ED WHICH EXCEEDED THE WHITE PLATE PITCH CHANGE LINK  
END TO THE WHITE PLATE PITCH CHANGE LINK FROM BEARING OVERSTRESS.

L. FUEL CONTROL AND OVERSPEED CONTROLS: TENSORS OF THE FUEL  
CONTROL AND OVERSPEED CONTROLS REVEALED THAT THE FLYWEIGHT BASE  
ASSY P/N 7701 AND FLYWEIGHT AND SHAPING WAS ASSY P/N 10003, IN

PAGE 3 FURTHERMORE UNCLAS  
THE OVERSPEED CONTROLS WAS FAILED. LABORATORY METALLURGICAL ANALYSIS  
OF THE FAILED PARTS IS STILL PENDING. COMPLETE LABORATORY ANALYSIS  
WILL BE NOTED IN THE DIR WHICH WILL FOLLOW THIS REPORT.  
BT

VMO-5 AAR 1-67A, of 14 APRIL 1967, UH-1E BUNO 152437, PILOT GREENLESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

Action section complete and return to Base Adjutant

RESUME OF ACTION TAKEN

INITIALS OF COGNIZANT OFFICER

S/S	
G-1	
G-2	
G-3	
G-4	
COMPT	
ADJ	
AUDIT	
CHAP	
COMMO	
DIC CMA	
DENTO	
DIGRO	
DPO	
EXCHO	
FIRE CH	
FOOD DIR	
IRG	
ISO	
LEGO	
MAINTO	
MEDO	
MTO	
GRDO	
POSTO	
PROMAR	
PWO	
RI & TD	
SAT DIR	
SSO	
SUPO	
GIC GWR	
ASMOH	
OP/ORDW	
PERSO	
S & C	
NPD	

4721  
RTTU JAW RUVTUBA0439 1442105-UUUU--RUWJDFA.  
ZNR UUUUU  
R 242100Z MAY 67  
FM CO ARADMAC CORPUS CHRISTI TEXAS  
TO MAROBSRON FIVE MCAF CAMP PENDLETON CALIF  
BT

UNCLAS SAVAE-Q 05-1374 FOR LT SCOTT.  
SUBJECT: UH-1E AIRCRAFT BUHO 152437, PRIORITY DIR.  
FAILURE OF THE FLYWEIGHT IN THE OVERSPEED GOVERNOR RESULTED  
FROM OVERSTRESS AND WAS IN A BRITTLE MANNER. ALL OTHER  
DISCREPANCIES WERE FROM IMPACT DAMAGE OR POST CRASH FIRE.  
BT

S/S	
G-1	
G-2	
G-3	
G-4	
COMPT	
ADJ	
AUDIT	
CHAP	
COMMO	
CIC CSA	
DENTO	
DISBO	
DPO	
EXCHO	
FIRE CH	
FOOD DIR	
IRG	
ISO	
LEGO	
MAINTO	
MEDG	
MTG	
ORDO	
POSTO	
PROMAR	
PWO	
RL & TO	
SAF DIR	
SSO	
SUPO	
CIC GWR	
ADMCH	
OP/ORDW	
PERSO	
S & C	
NPO	

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES  
VMD-5 AAR 1-67A, of 14 APRIL 1967, UH-1E BUHO 152437, PILOT GREENLESE

Action section complete and return to Base Adjutant

RESUME OF ACTION TAKEN

(b) (6)

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INITIALS OF COGNIZANT OFFICER

ENCLOSURE (9)

# PRIORITY

1. SYSTEM/ACTIVITY <b>ARAIMAC</b>		2. REPORT NO. <b>8-55</b>	3. DATE OF R/T <b>4-27-67</b>	4. ASSEMBLY NOMENCLATURE AND PART NO. <b>Gas Turbine Engine, 1-000-080-02</b>			5. <input checked="" type="checkbox"/> <b>DISCREPANCY</b>	
6. ASSEMBLY (Serial) <b>T53-1-11</b>		7. ASSEMBLY (Serial) <b>LEO9582</b>		8. DATE FINISHED <b>4-24-67</b>	9. REMOVED FROM (Eng Ser) <b>1</b>		10. REMOVED FROM (Eng Ser) <b>152437</b>	
11. TOTAL HRS SINCE REY <b>868</b>	12. HRS SINCE LAST R/W <b>419</b>	13. DATE LAST R/W <b>4-25-66</b>		14. LAST OVERHAUL ACTIVITY <b>ARAIMAC @ 1445.8 Hrs TT</b>		15. NO. PREV R/W'S <b>1</b>		16. AIRCRAFT (Serial) <b>UH-1E</b>
17. OPERATING ACTIVITY <b>VMO-5</b>		18. FOR - EPN - AAR - I/PN/MA <b>%</b>		19. REASON FOR REMOVAL AND CODE <b>Aircraft Accident</b>				
20. FINDINGS <input checked="" type="checkbox"/> <b>NO DISCREPANCY</b>		<input type="checkbox"/> <b>BASIC (MFG/DESIGN) DISCREPANCY</b>		<input type="checkbox"/> <b>NON-BASIC (MFG/OPER) DISCREPANCY</b>		<input type="checkbox"/> <b>FOREIGN OBJECT DAMAGE</b>		21. REPAIR PLAN FAILURE (Part No.) <b>CONC. SIDE</b>

22. DESCRIPTION OF FINDINGS (Include name and part no. of primary part failure)

a. The lower right hand forward engine mounting pad was fractured from overstress by ground impact (Incl 1).

b. The fuel control and overspeed governor had been removed by ARAIMAC for teardown investigation when this photo was taken (Incl 2). The linear actuator had been beeped up to 6575 rpm N2 speed.

c. The 72 bolt flange on the combustion chamber housing was damaged and the combustion chamber housing was also buckled in this area (Incl 3).

d. The top engine mount on the air diffuser was also distorted (Incl 3)

e. The power output cover and torque meter were heavily

23. DISCREPANT PARTS (Part No.)

1-000-080-02	Scrap

24. PERTINENT BULLETINS, CHANGES, ETC. INCORPORATED

NUMBER	YES	NO

25. <input checked="" type="checkbox"/> <b>PRIORITY DIS</b>	26. REQUESTED BY <b>NAVAIRSYSCOM/REPPACLA</b>	27. REFERENCE <b>NASCREPPAC 2409-67</b>	28. <input checked="" type="checkbox"/> <b>DISC. 11A</b>	29. APPLICABLE <input type="checkbox"/> <b>INCORPORATED</b>
30. TITLE <b>Equipment Specialist (Aircraft)</b>			31. DATE <b>17 May 67</b>	

DISASSEMBLY AND INSPECTION REPORT NAVFORS FORM 4730/2 (11-61) REPORT SYMBOL BUWEP 4730-2

damaged by impact (Incl 4). Some of the mounting studs and spacers had been sheared from the power output cover (Incl 5).

f. The engine data plate and inlet housing core plug boss were heavily damaged on the top left hand side of the air inlet housing (Incl 6).

g. The sections of the air inlet housing failed from overstress by ground impact (Incl 7).

h. The engine end of the drive shaft was bent upward and to the right at the splined section of the curvic coupling. Wire from the air inlet screen was found behind the curvic coupling (Incl 8).

i. The inlet guide vanes were extremely distorted by ingestion of wire from the air inlet housing and studs and a spacer from the power output cover (Incls 9 & 10).

j. The air inlet housing was cracked by the core plug which had been forced down into the housing by ground impact (Incls 10 & 6).

VMO-5 AAR 1-67A, of 14 APRIL 1967, UH1E BUONO 152437, PILOT GREENLESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

ENCLOSURE (10)



# PRIORITY

Q-55, UH-1E, S/N 152437, T53-L-11, S/N LEO9582

k. The exhaust diffuser was buckled between the 3, 6, and 9 o'clock struts just aft of the power turbine (Incl 11).

l. Only minor damage was noted on the N1 turbine wheel blades. The debris in the bottom of the combustion chamber curl consisted of magnesium ash, asbestos, fine gravel, coke, aluminum particles, very small green leaves, and twigs (Incl 12).

m. Minor blade tip erosion was noted on the N1 turbine wheel. The blades were also covered with magnesium ash machined from the compressor housing (Incl 13).

n. The N1 turbine nozzle was cracked in two places on the inner vane shroud support (Incl 14). The material lodged in the N1 turbine nozzle vanes consisted of carbon as the major material. Aluminum was present in a minor quantity. Nickel and lead were present only in trace amounts. Heavy deposits of magnesium ash were noted on the nozzle curl (Incl 15).

o. Material removed from the air diffuser was identified as asbestos, carbon, aluminum, and a paint-like film. Spectrographic analysis also identified the material as containing chromium, iron, magnesium, nickel, silicon, and titanium in major amounts. Silver, aluminum, copper, manganese, and molybdenum were present in minor quantities (Incl 16).

p. Buckling noted in the exhaust diffuser caused misalignment of the N2 turbine and caused the turbine stub shaft to contact the ID of the compressor shaft (Incl 17). The aft rim of the N1 turbine wheel also contacted the inner vane support on the N2 nozzle (Incl 18).

q. The buckled exhaust diffuser also caused the N2 turbine wheel forward rim face to contact the inner vane support (Incls 19 & 20).

r. The rear seal, P/N 1-130-097-02, and forward seal, P/N 1-130-094-02, was missing from the top of the combustion chamber housing (Incl 21).

s. Removal of the compressor housing halves revealed high speed machining on the top half of the axial compressor housing at the fourth and fifth stages only (Incls 22 & 23). The centrifugal compressor housing revealed high speed machining and stationary impact marks (Incls 22-24).

t. Upon removal of the bottom half of the compressor housing a spacer from the power output cover was noted in the fourth stage of the compressor. Examination of the first stage axial compressor revealed that one blade had broken off approximately 3/16" above the root platform. Microscopic examination revealed a 45° fracture with a shear lip on the convex side of the blade and pronounced plastic deformation which is typical of an overstress type failure (Incls 25 & 26). Microscopic examination of the inlet guide vanes revealed that the spacer and broken studs from the power output cover, wire from the inlet air screen, and the broken blade from the first stage compressor had contacted the rear side of the inlet guide vane (Incl 27). The blade and studs were not recovered and probably passed out through the exhaust diffuser

PRIORITY

in the form of small particles. The appearance of the axial compressor blades and centrifugal compressor vanes indicate an estimated rpm of approximately 55-60% of N1 speed (Incls 26 & 28). Most of the blades and some of the vanes were swept opposite the direction of rotation in varied angles. Runout on the compressor revealed a misalignment or shift of 0.0078" on the 5th stage spacer; maximum allowed is 0.003".

u. Removal of the exhaust diffuser from the combustion chamber housing revealed a buckled area just aft of the mounting flange (Incl 29).

v. There was no indication of oil starvation. Varnish deposits from burned oil were noted in the air inlet housing (Incl 30) and in the top of the oil screen on the accessory drive gear box (Incl 31).

w. Heavy carbon deposits from burned oil were noted in the oil pump (Incl 32).

x. The substance (Incl 33) found behind the outer shroud on the air inlet guide vanes was identified as asbestos, carbon particles, magnesium chips, and pieces of chrome wire of 1/24" diameter. Spectrographic analysis identified the material as silver, aluminum, chromium, iron, magnesium, manganese, nickel, and silicon to be present as major constituents. Copper, molybdenum, lead, and titanium were present in minor amounts.

y. The N1 turbine wheel tip diameter measured 11.869". Engine assembly records at ARADMAC revealed that the turbine wheel measured 11.868 inches at the time of minor repair. Blade growth was 0.0005".

z. The N2 turbine wheel tip diameter measured 13.146". Engine assembly records at ARADMAC revealed the turbine wheel had new blades installed and the tip diameter measured 13.140" at the time of minor repair. Blade growth was 0.003".

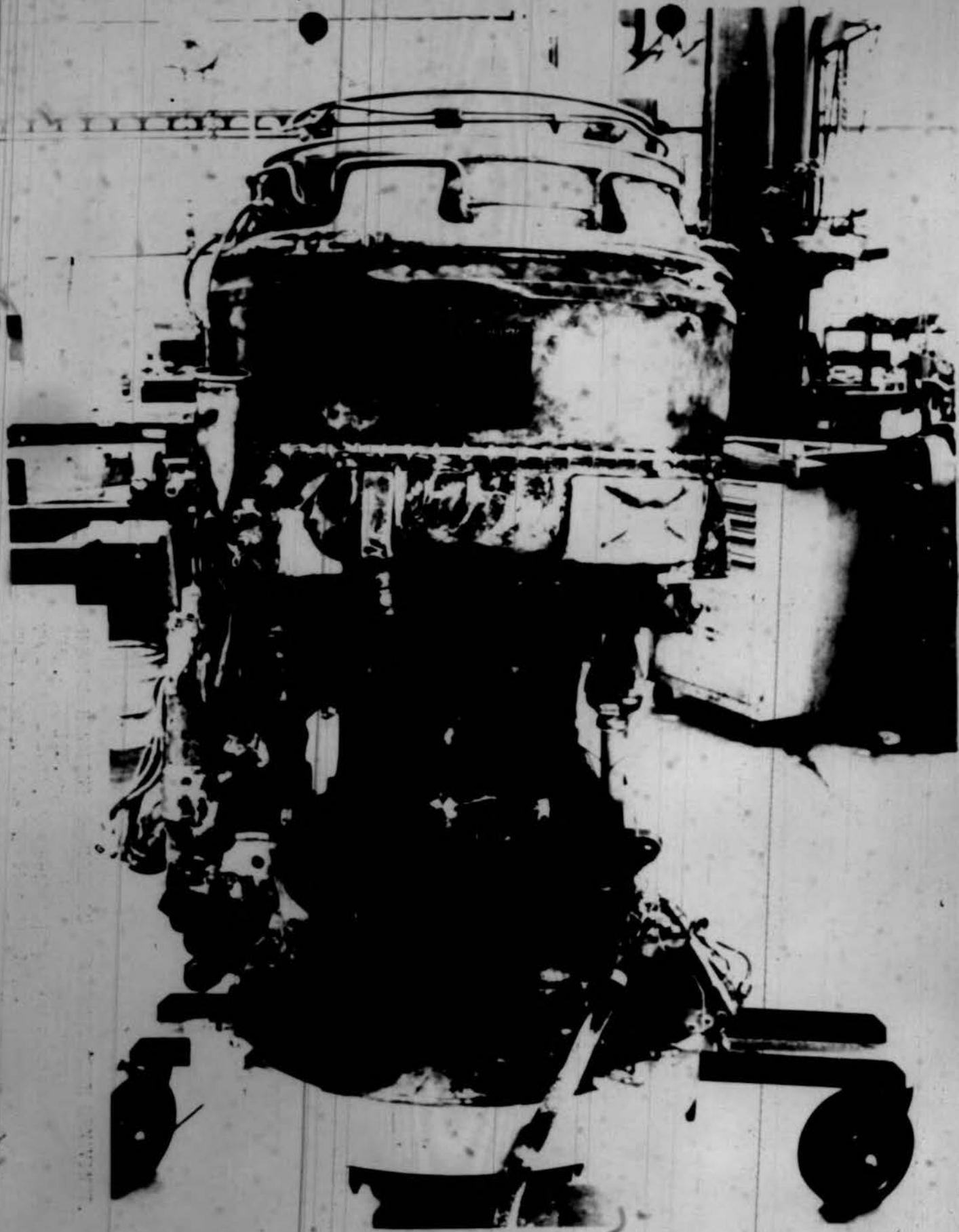
NOTE: 1. The materials identified as asbestos chromium or chrome wire originally came from the chafing strip or seal on the forward fire wall assembly and was ingested by the engine at the time of impact.

2. Spectrographic analysis of the material removed from the magnetic chip detector plug was principally iron, with large amounts of magnesium, nickel, chromium, and silicon. Titanium, aluminum, and copper were present in somewhat smaller amounts.

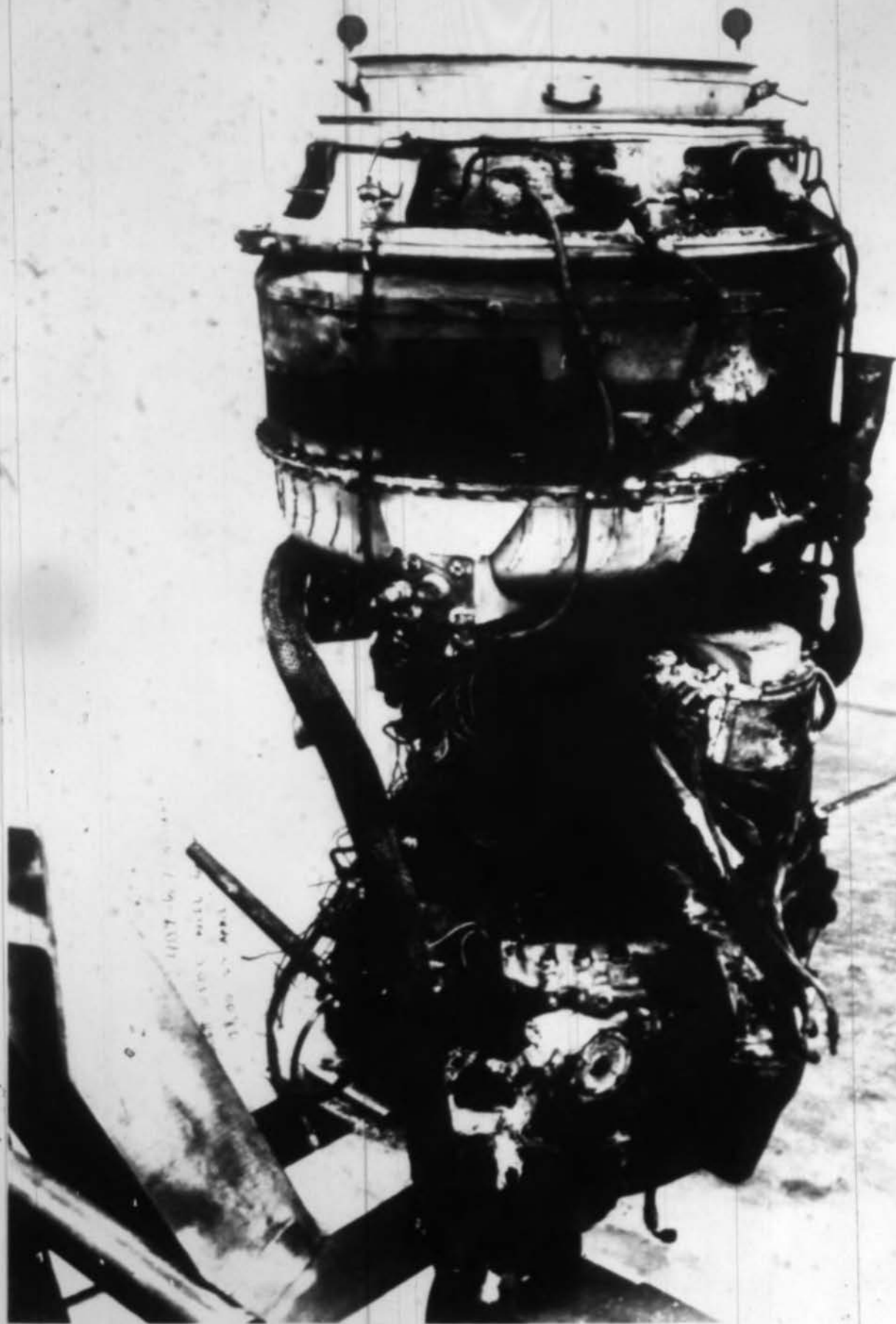
27. Conclusions: The engine was operating at the time of ground impact.

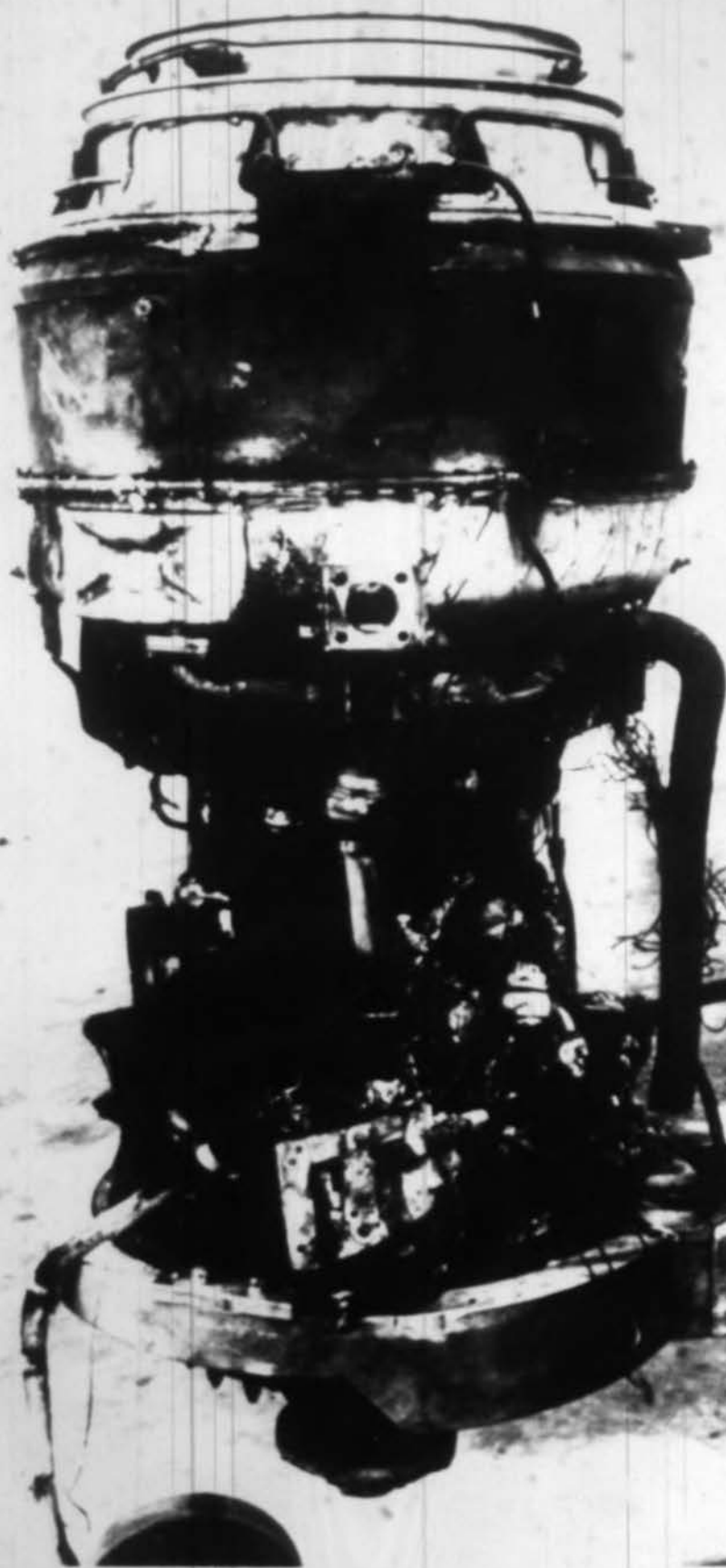
28. Recommendations: None

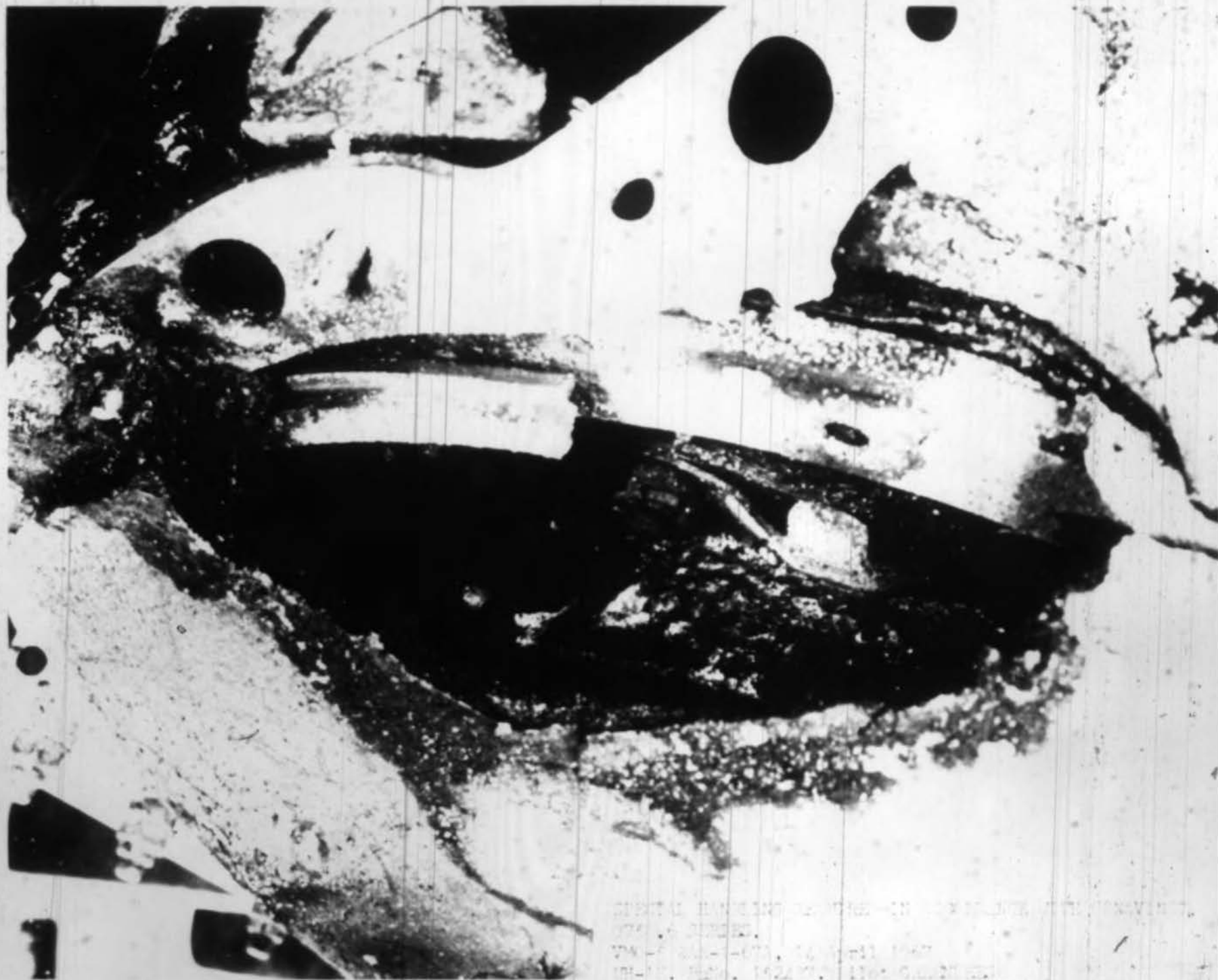
VMO-5 AAR 1-67A, of 14 APRIL 1967, UH1E BUNO 152437, PILOT GREENLEESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"





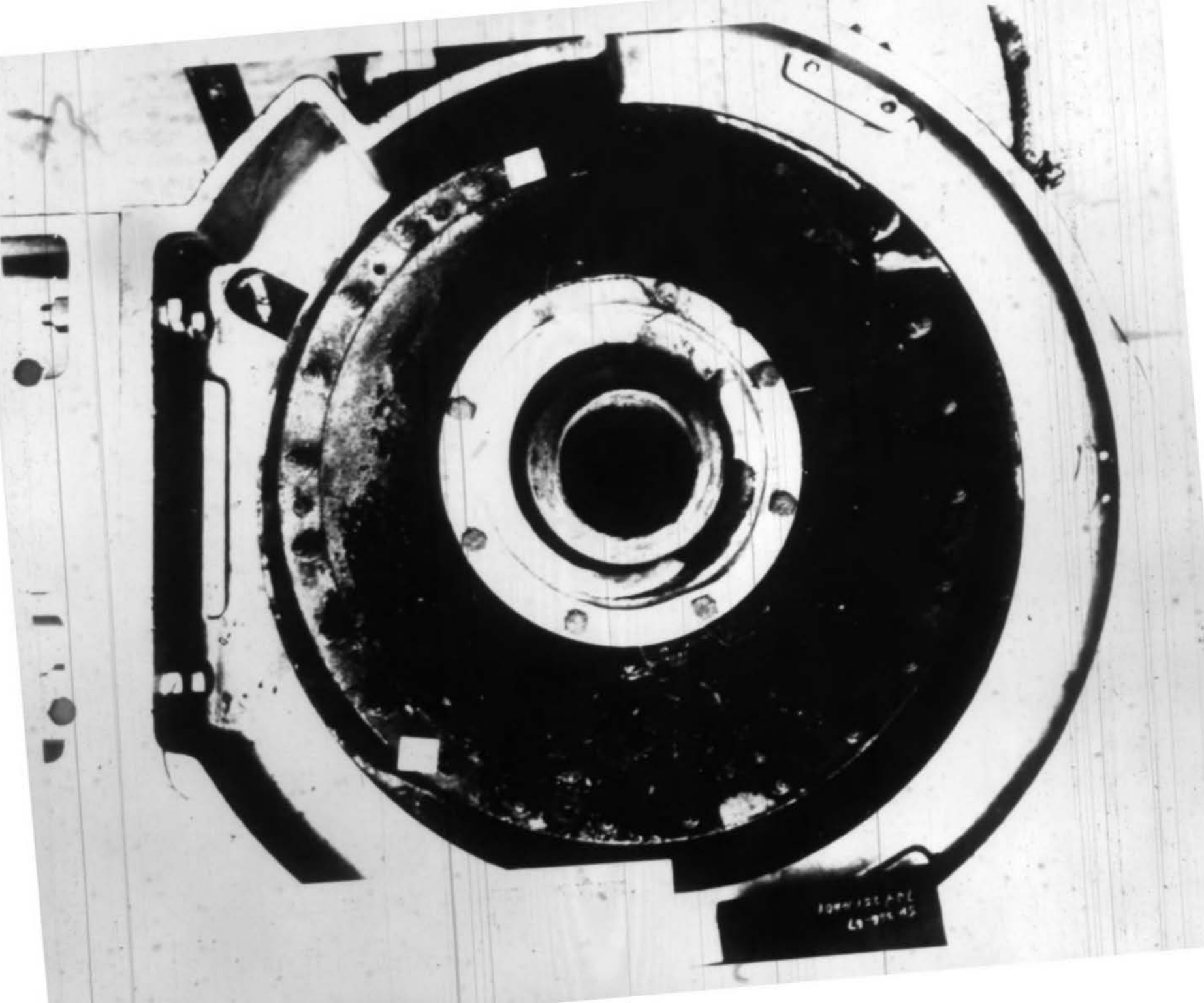


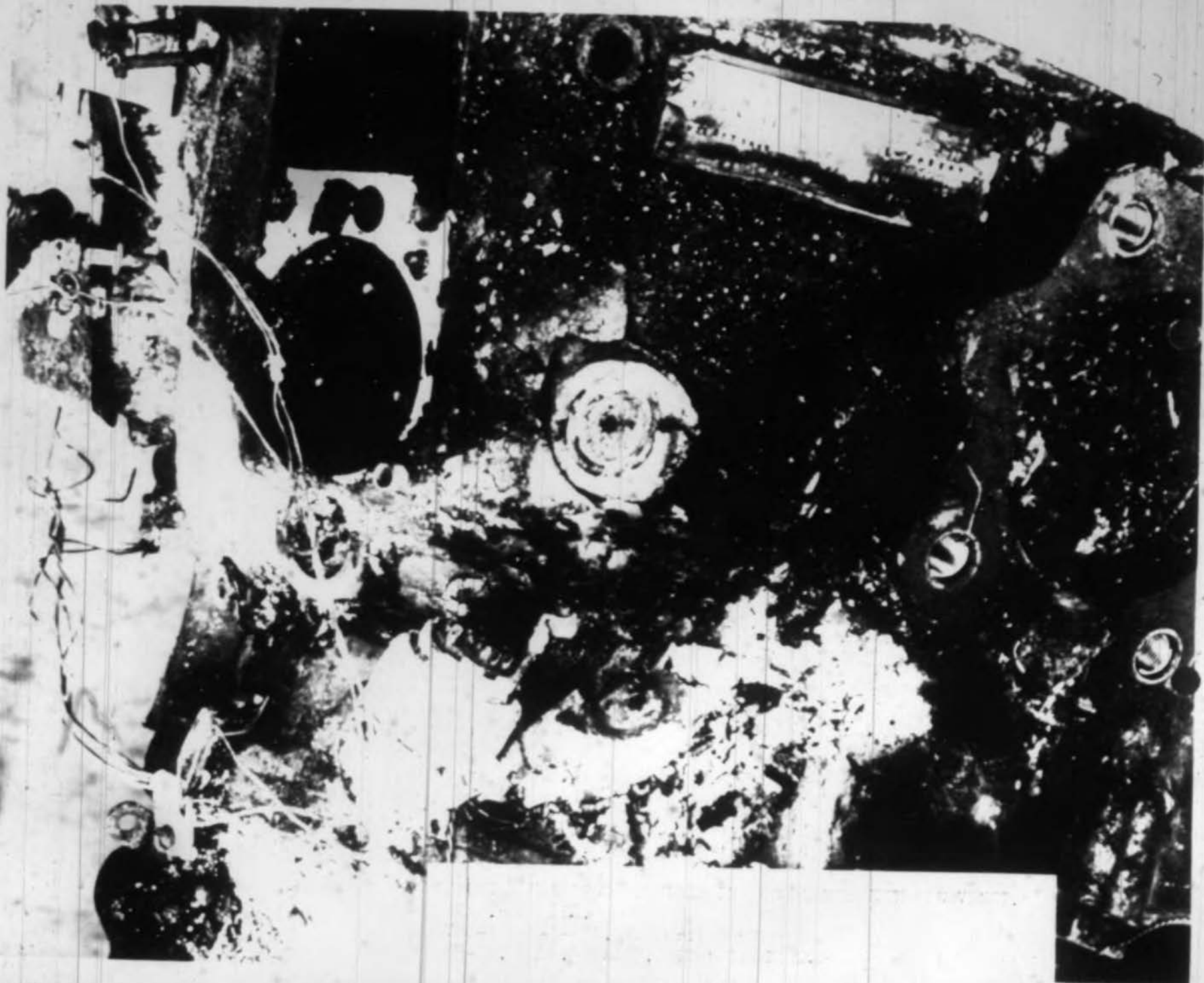





PHOTOGRAPH OF THE REMAINS OF THE AIRCRAFT  
RECOVERED FROM THE CRASH SITE  
ON 14 APRIL 1967  
REF. NO. 142173. 1160 GALLON





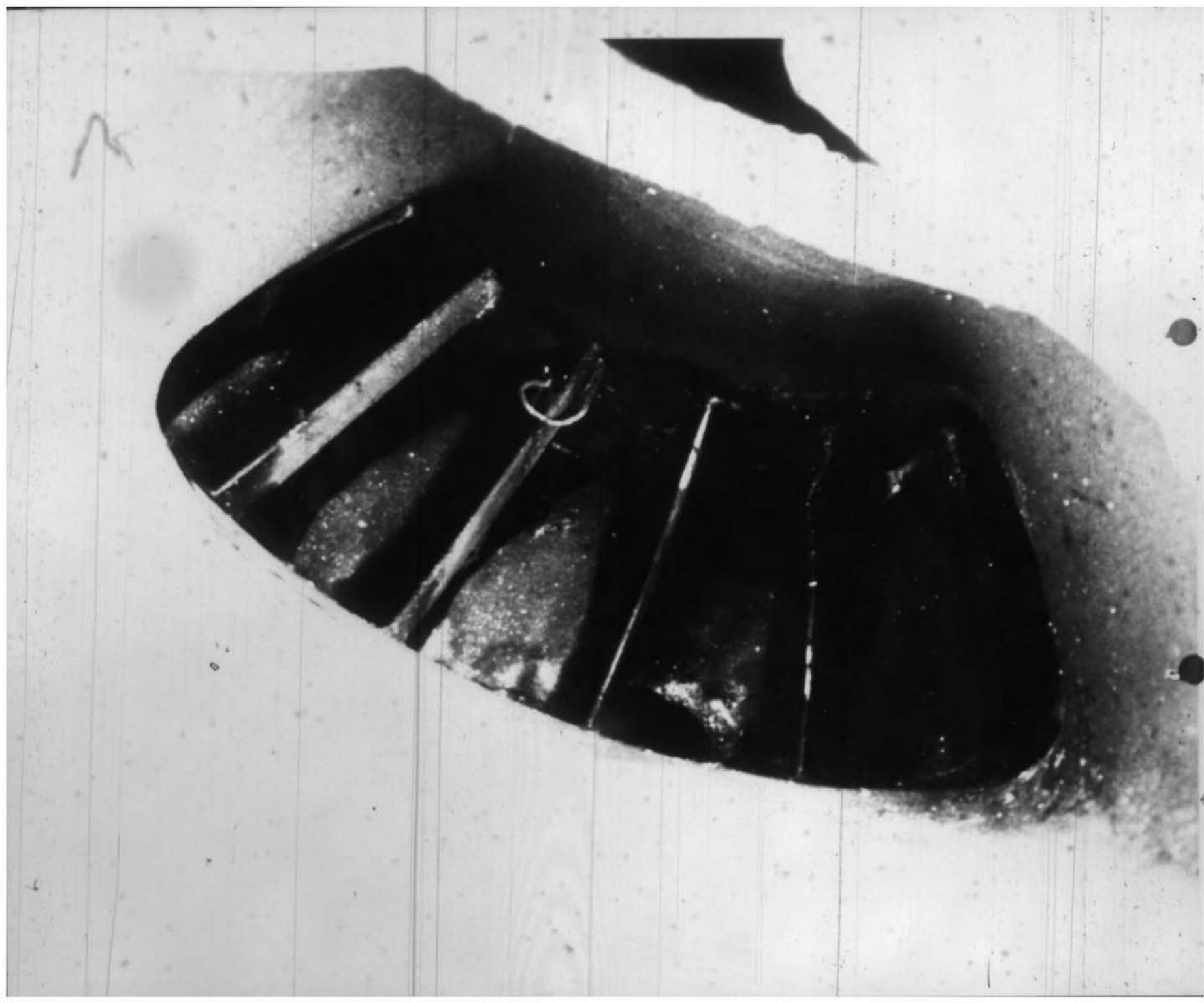




UN-1E AK BU. No 152437  
SECTIONS OF AIR INLET  
HOUSING FROM T53-L11  
ENG. S114 L&O 9682







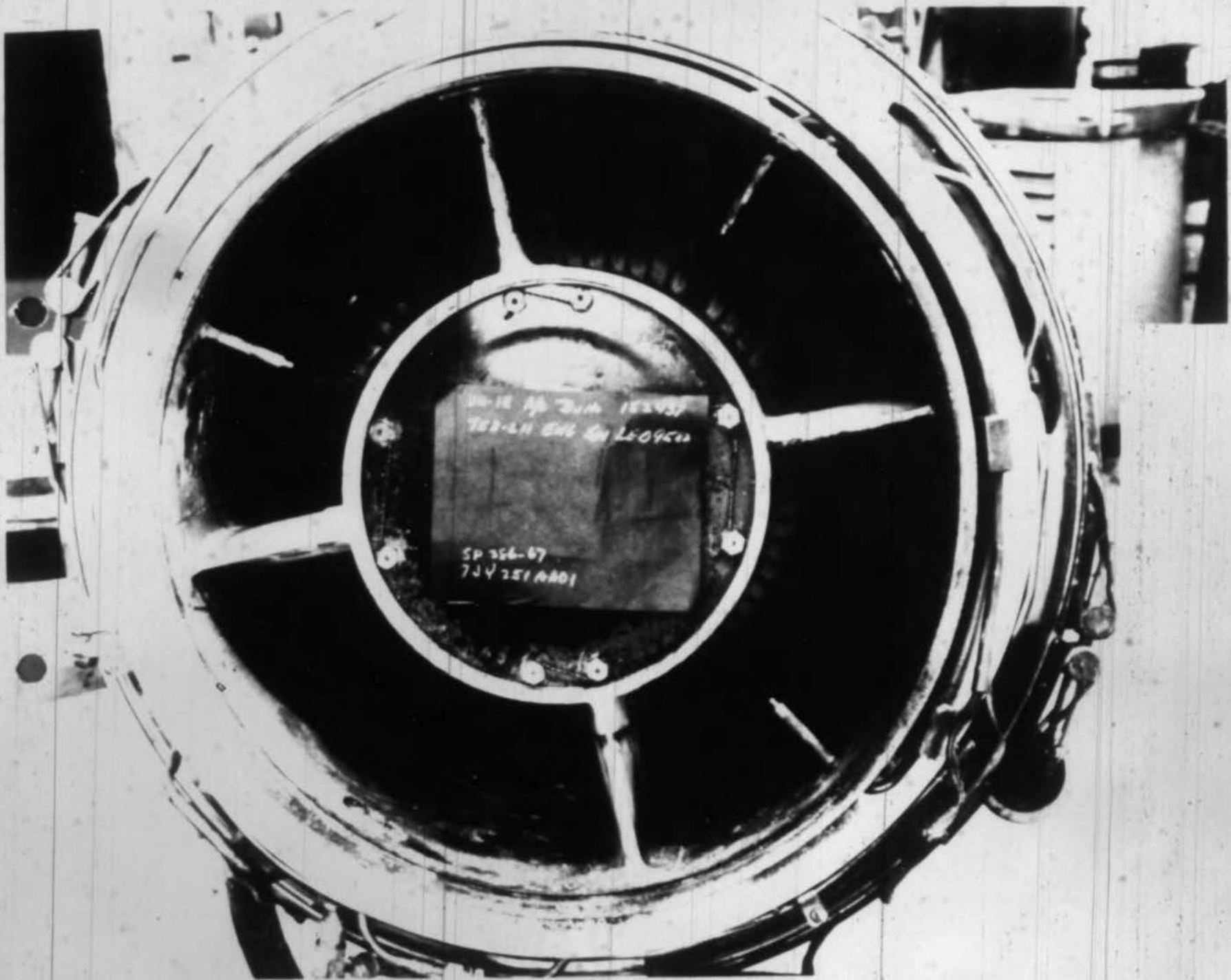


SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.

VMO-5 AAR-1-67A, 14 April 1967

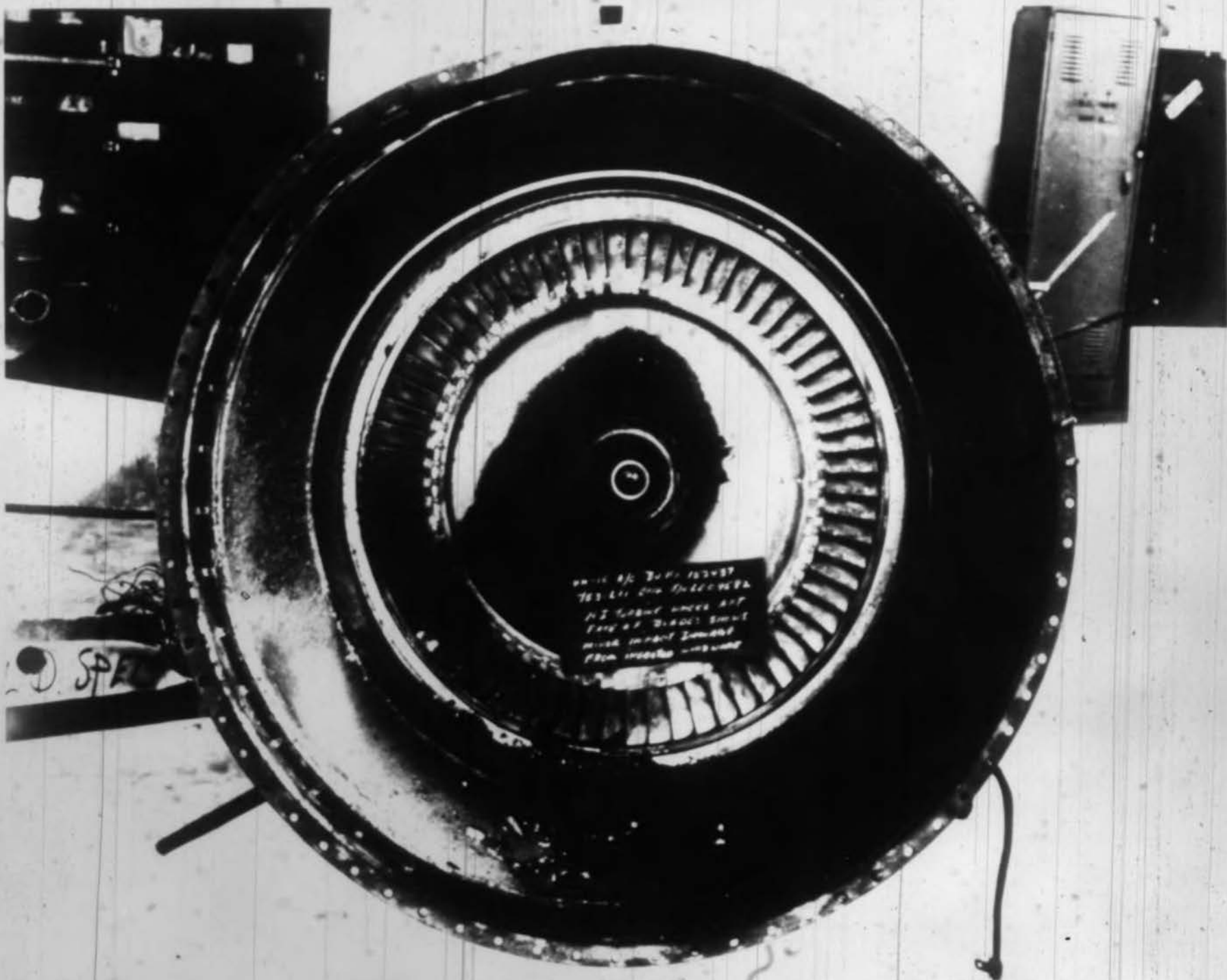
UH-1E, BuNo. 152437, Pilot GREENLEESE



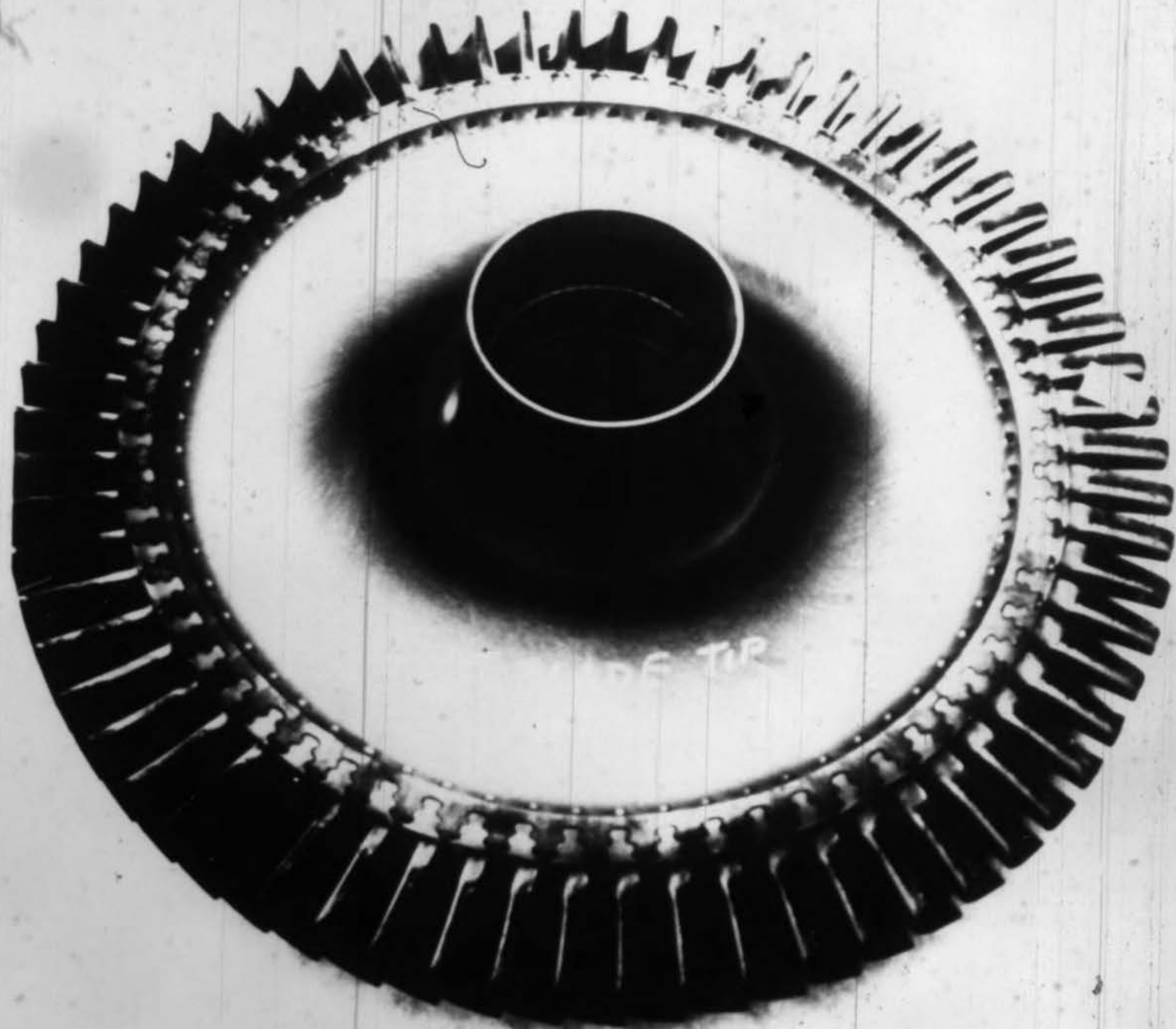


SP 356-67  
734 251 AAO1

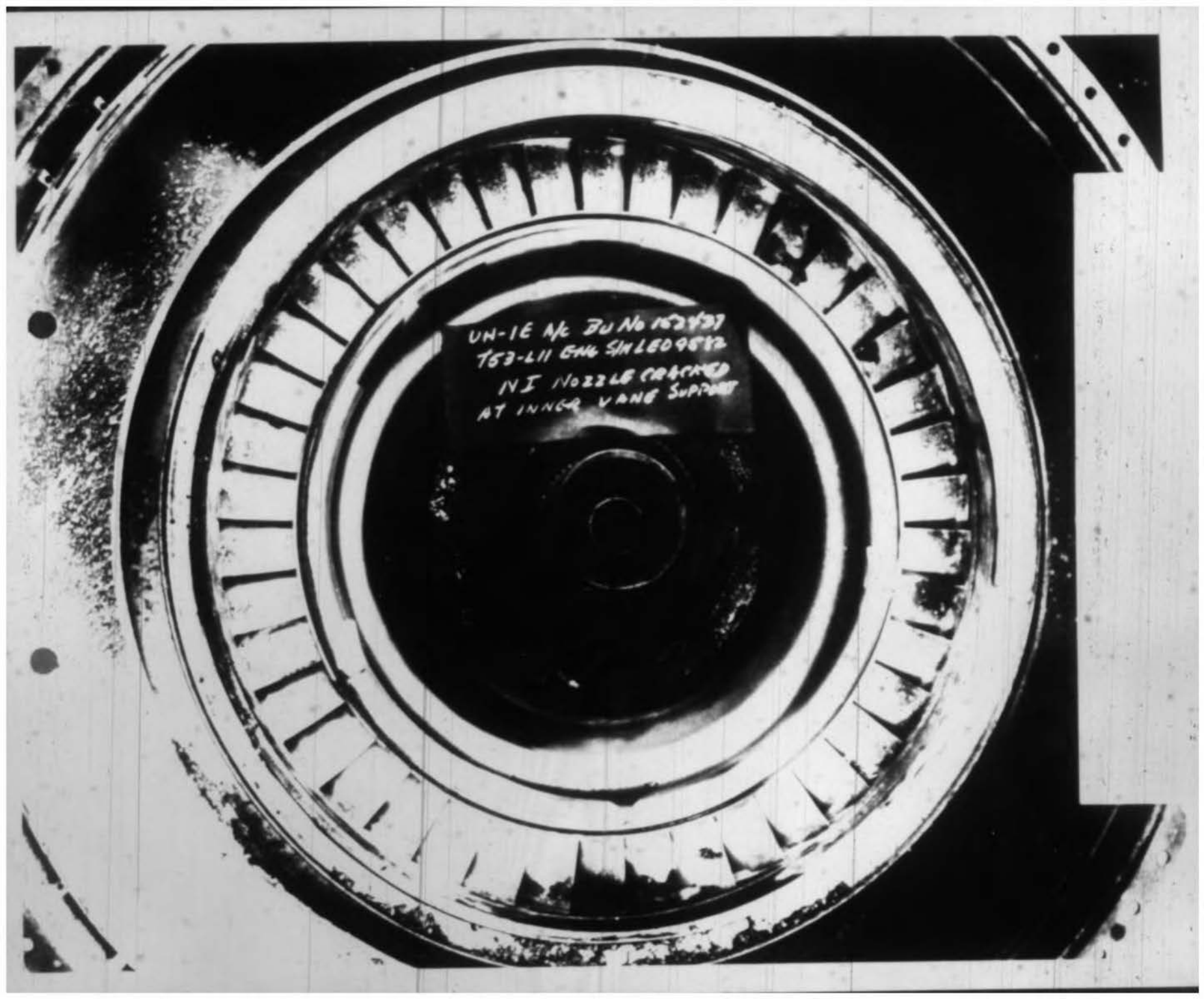
SP 356-67  
734 251 AAO1



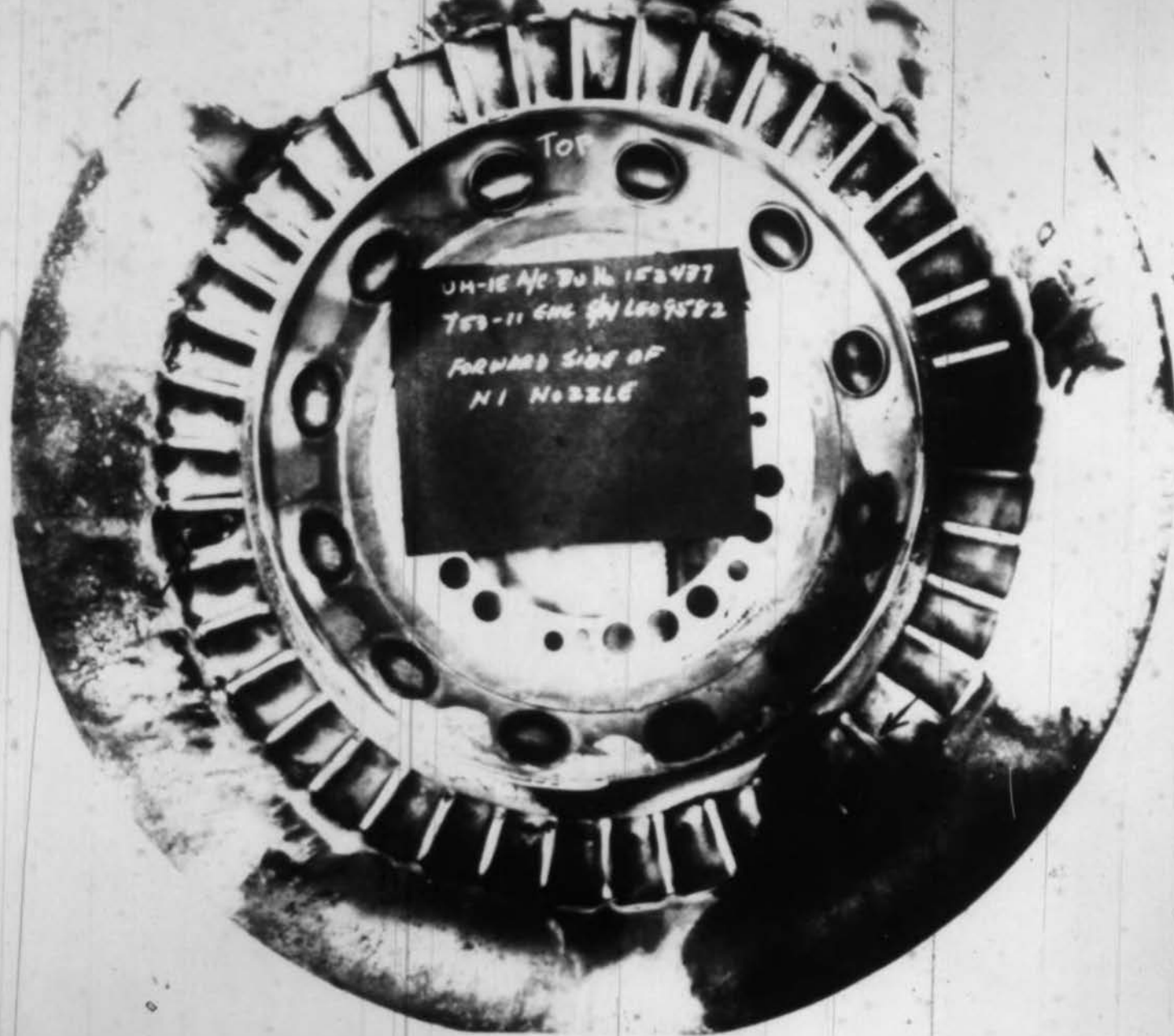
УНИВЕРСАЛЬНАЯ  
ТЕХНИКА  
ИЗДАНИЕ 1958  
СЕРИЯ 1  
ПРОДЮСЕР  
ПРОДЮСЕР





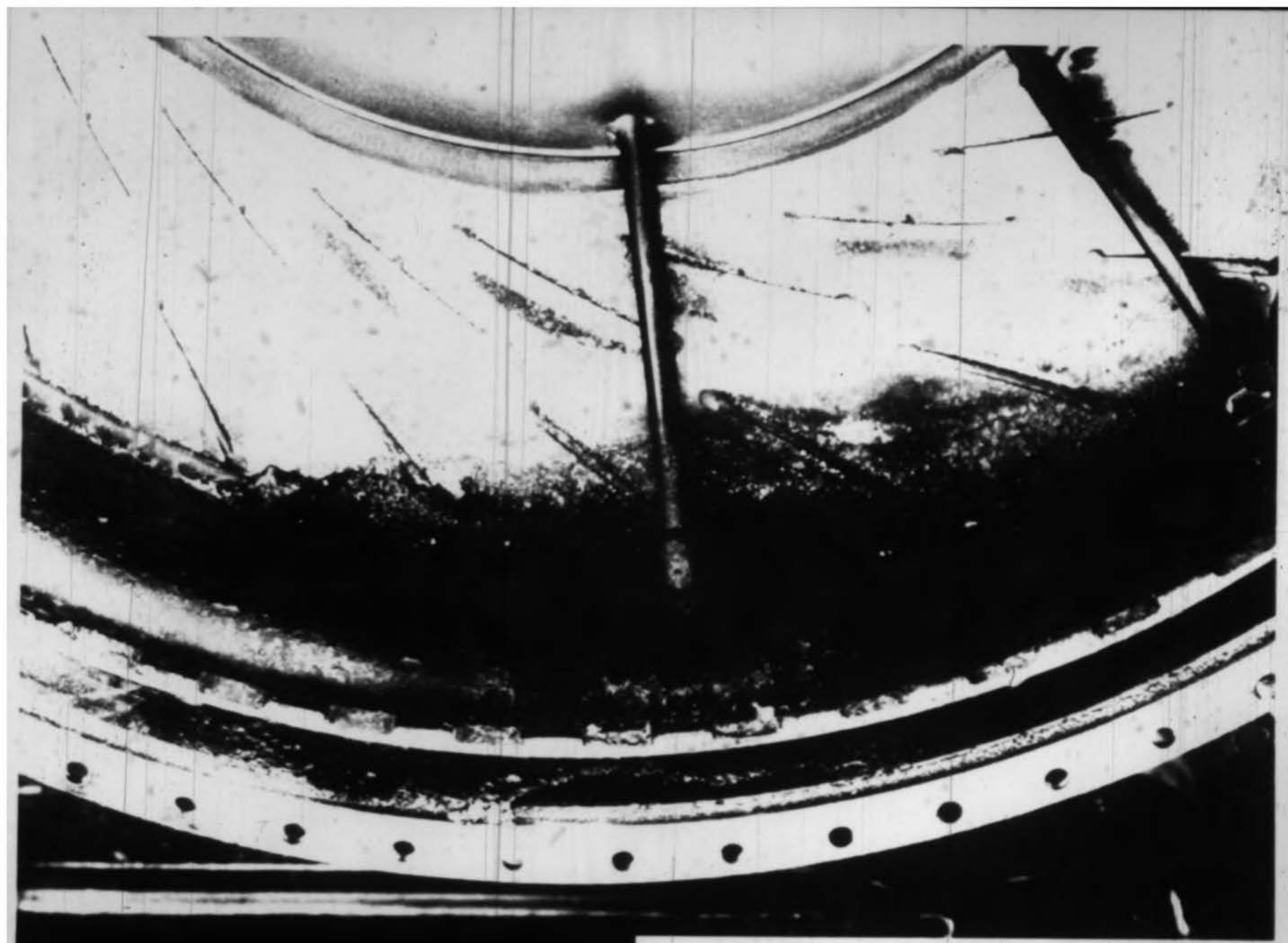


UN-1E AK Bu No 162437  
T53-L11 ENL SN 1609812  
IN I NOZZLE CRACKED  
AT INNER VANE SUPPORT



TOP

UH-1E A/C Bu No 152487  
T63-11 CMC S/N L609582  
FORWARD SIDE OF  
N1 NOZZLE



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH COMNAVINST.  
3750.6 SERIES.

VMO-5 AAR-1-67A, 12 April 1967

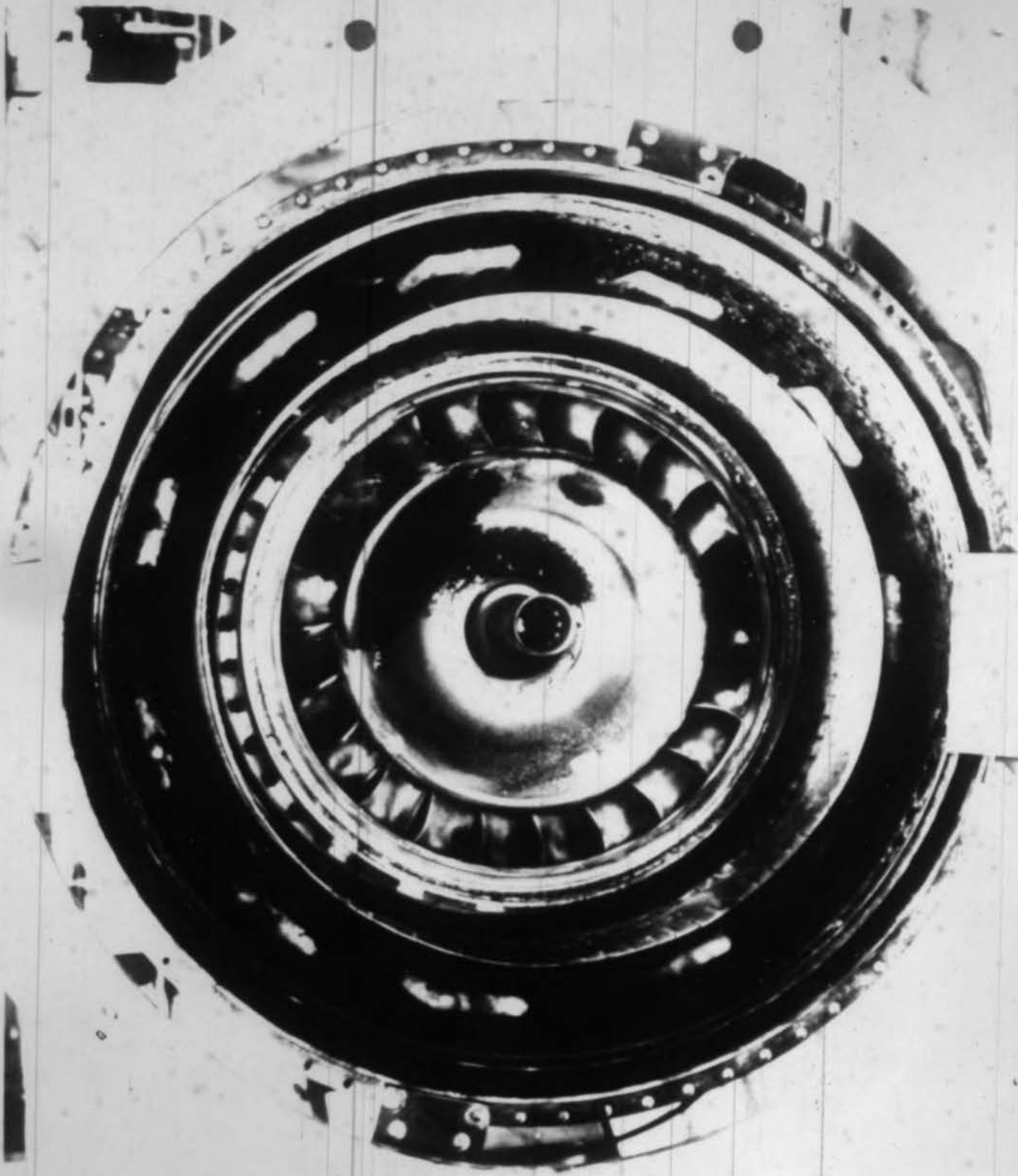
UH-1E, BuNo. 152437, Pilot GREENLESE



RECEIVED 10/11/64 10:00 AM  
1001 10-11-64 10:00 AM  
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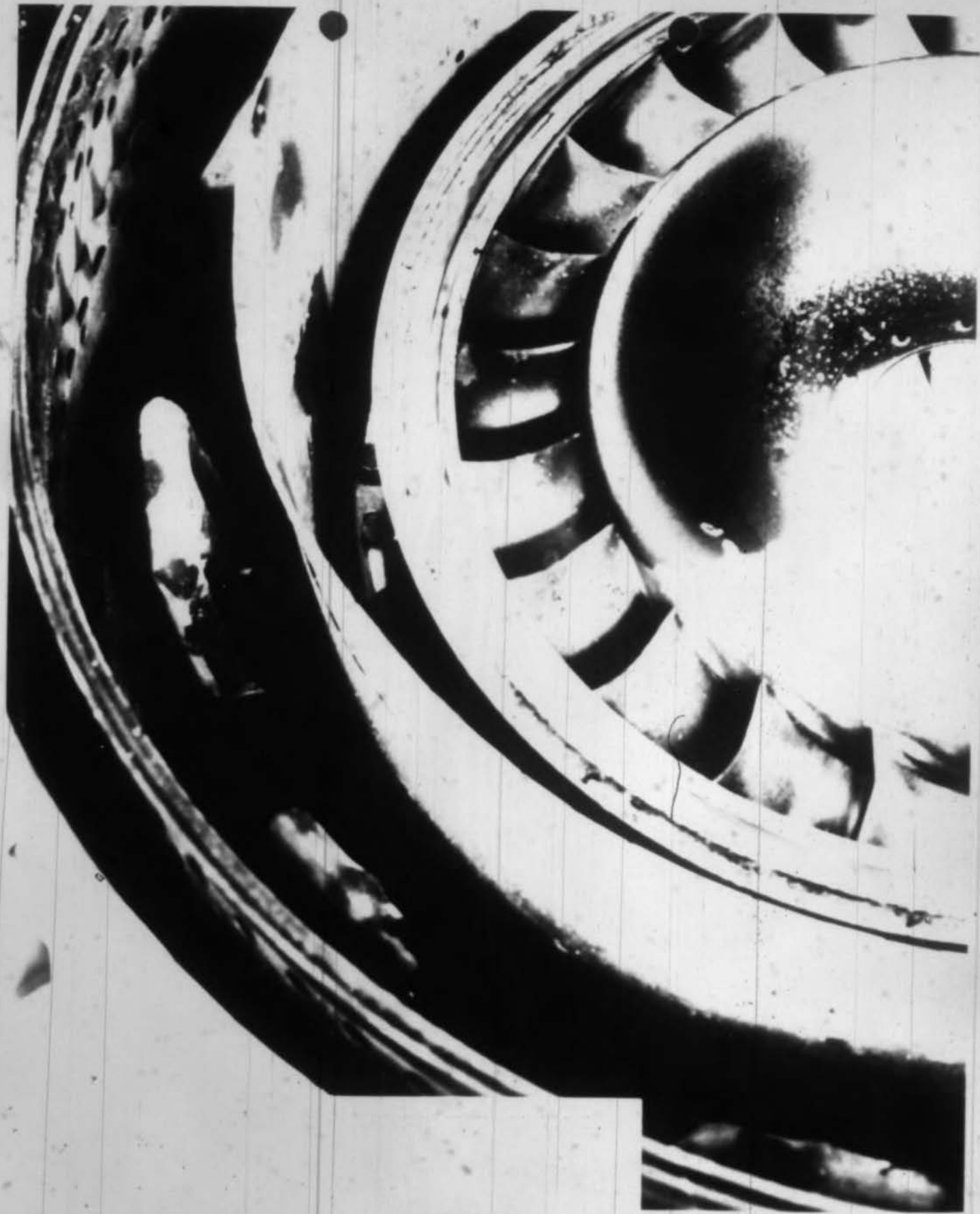


UH-1E A/C BuNo 152437  
T63-L11 ENG IN LEO9582  
COMPRESSOR SHAFT  
CONTACTED N2 TURBINE  
STUB SHAFT

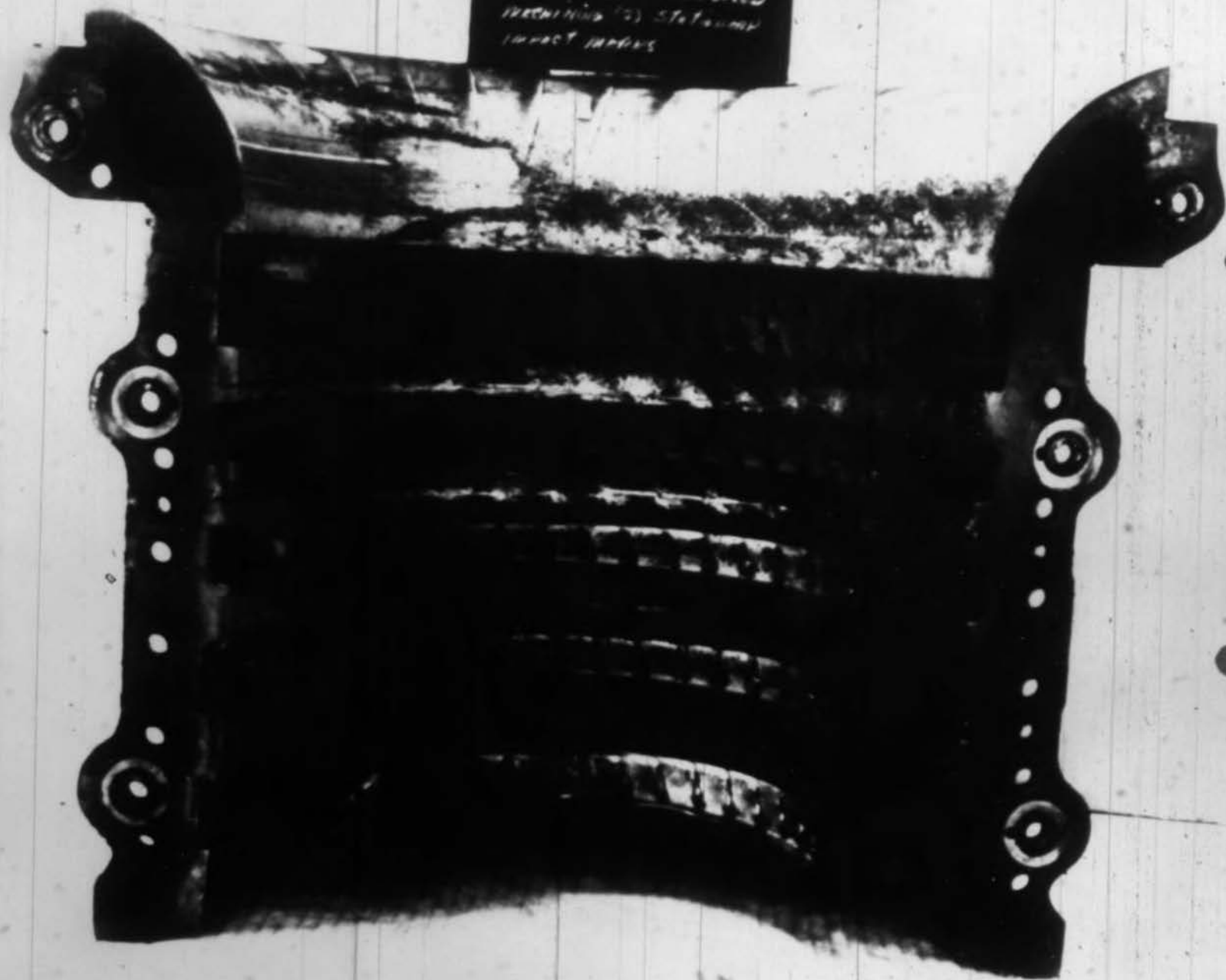


UN-16 Aft Bulkhead, 122000  
760-11 Eng 2nd Floor  
Furnished Tim Paul of  
N.E. Turbine Works  
Contacted under issue  
VINE Support

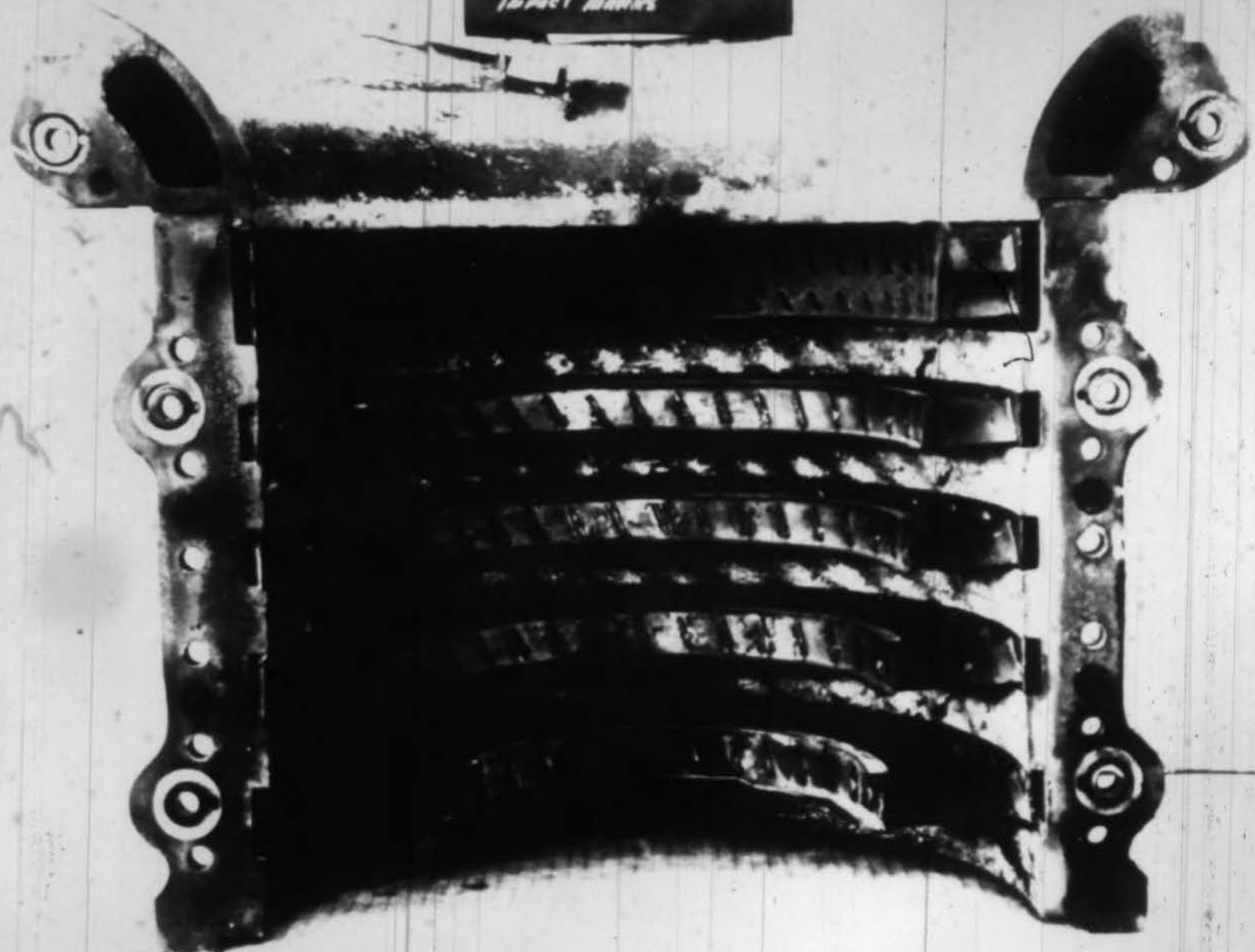




24-1E A/C Bu No 152437  
TED-LIN ENG SN 1609582  
NOTE TWO DEFINITE  
MARKINGS (1) HIGH SPEED  
MACHINING (2) STATIONARY  
IMPACT MARKING

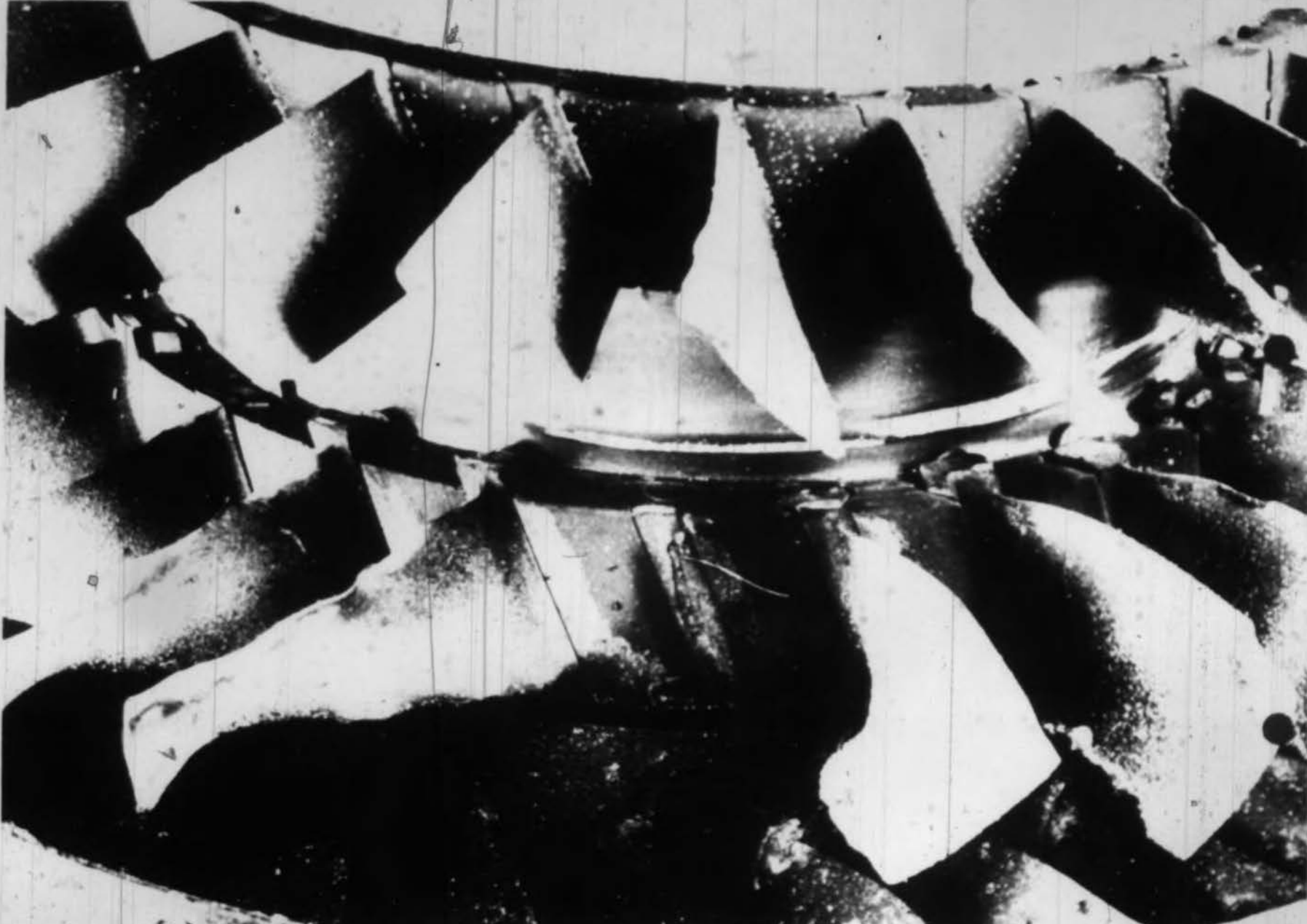


04-18 4/6 To No 152497  
763-LH 6/6 4/6 1509672  
Note Two Distinct  
Markings (1) New 6/6  
Markings (2) Stationary  
Impact Marks



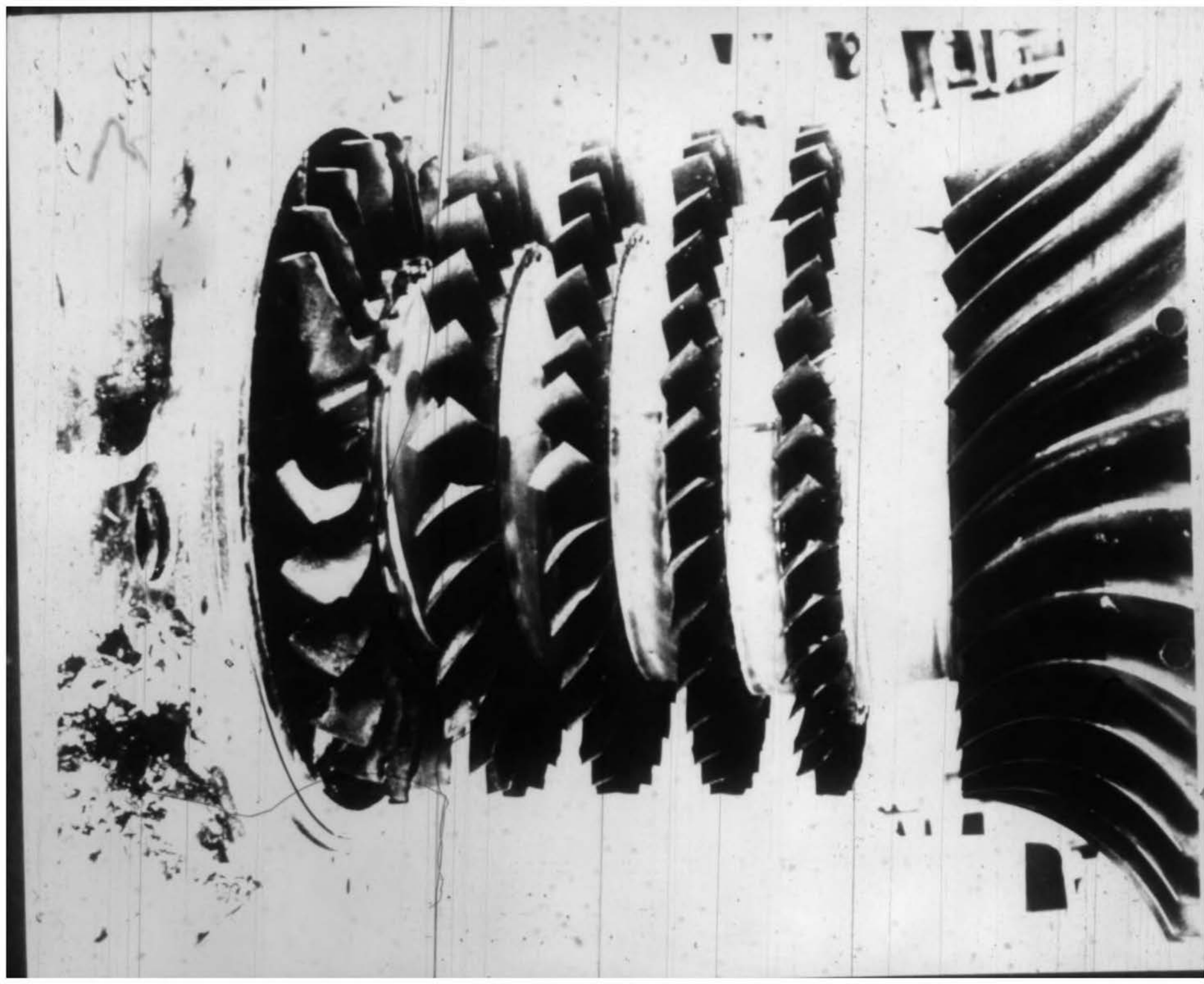


W-16 4/1 2/1 No 102437  
13-21-50 Sp. 609584  
NOTE: Two DUE DATE  
MAGNETS 101 HANDED  
RECEIVED 101 STATIONARY  
IMPACT JARRES



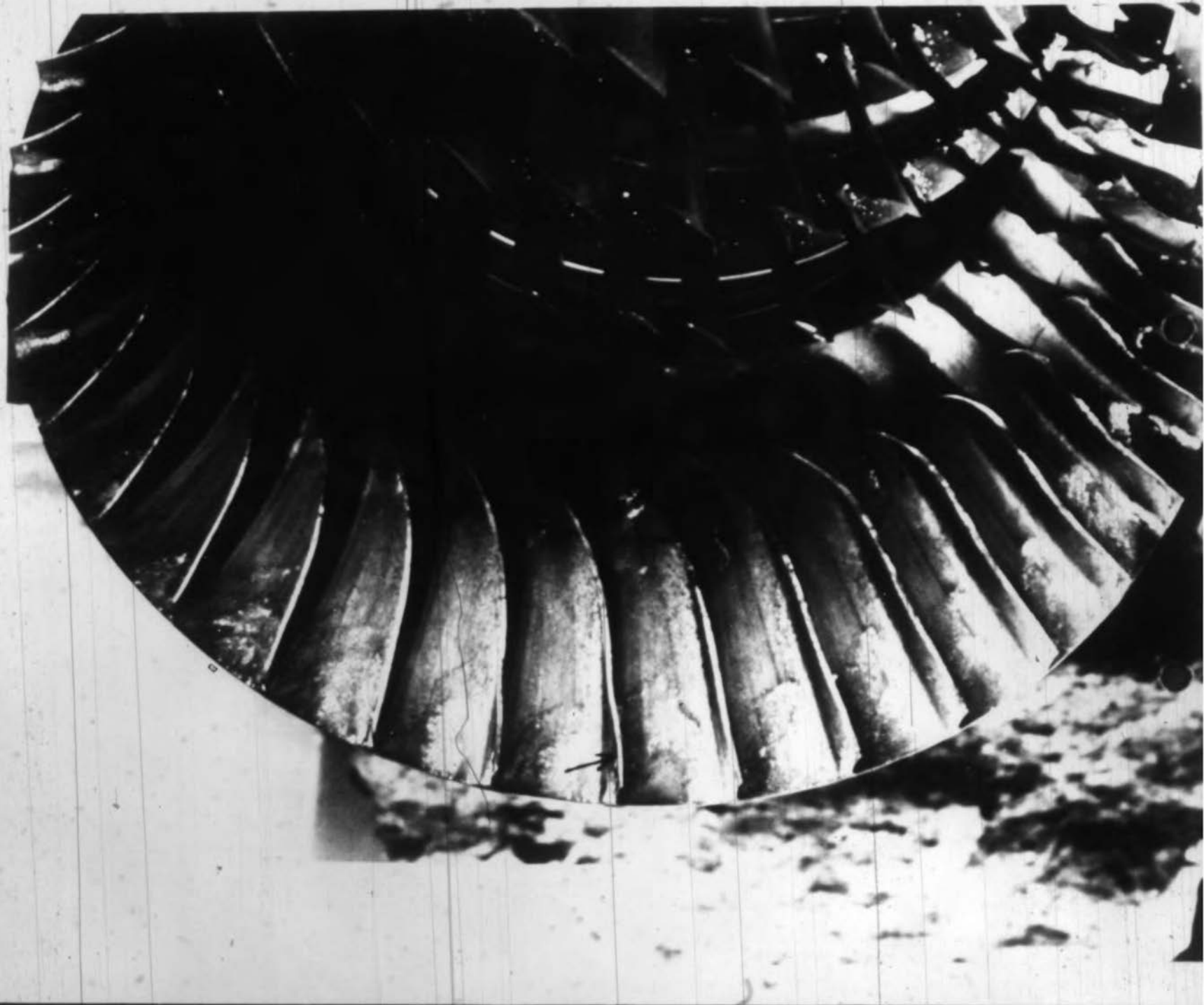
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.

VMO-5 AAR-1-67A, 14 April 1967  
UH-1E, P/Ng. 152437, Pilot GREENE





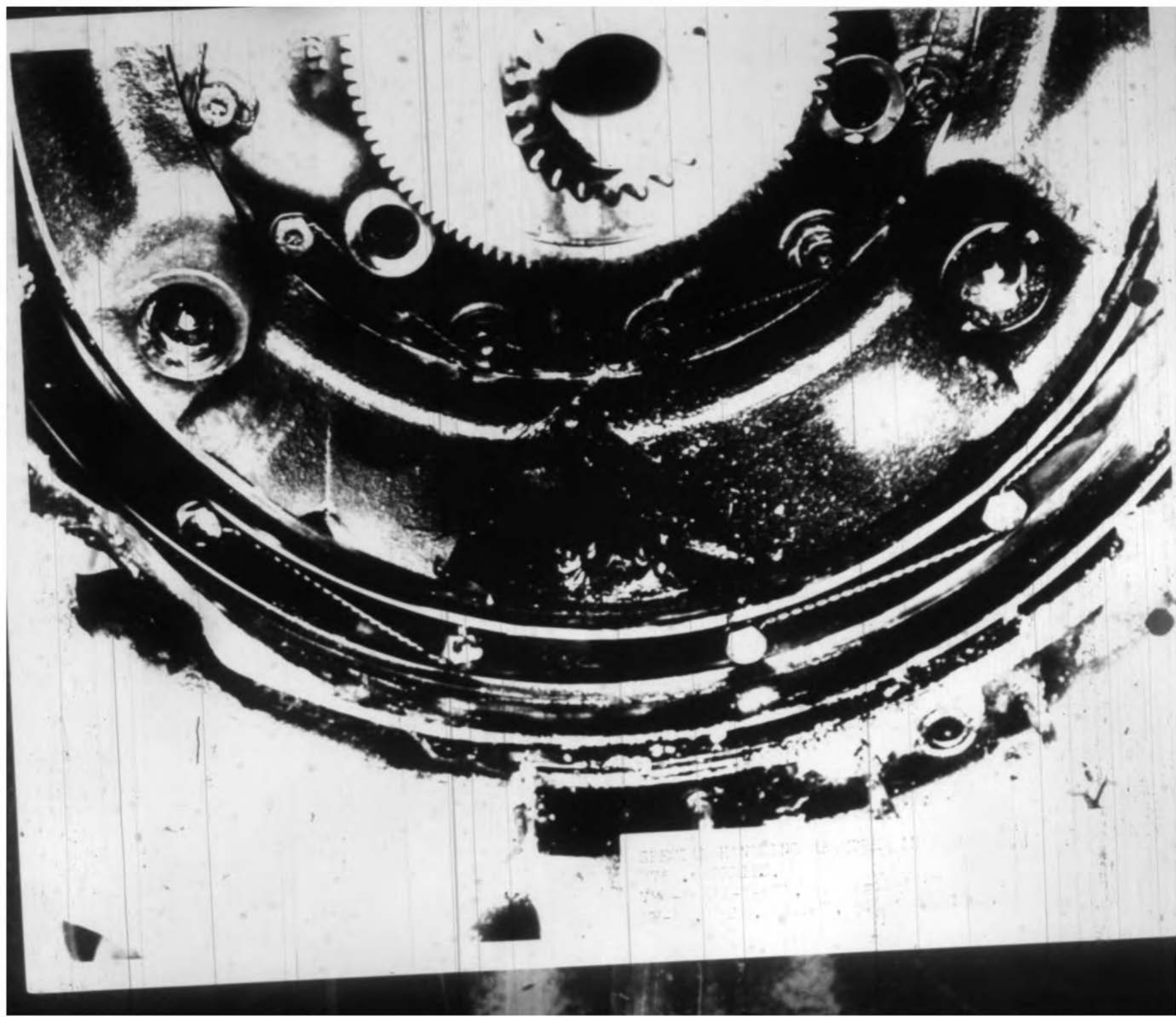




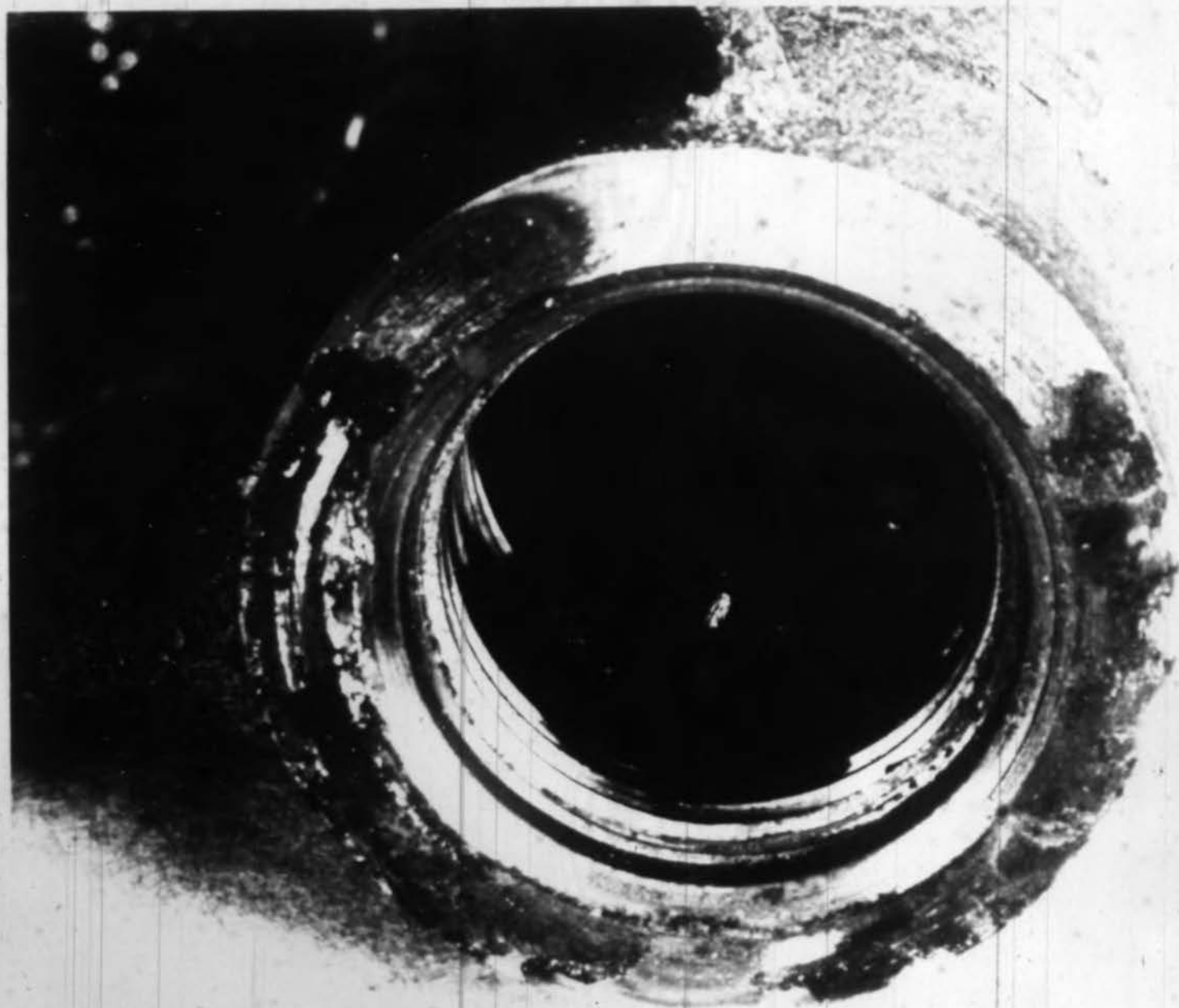
UN-18 A/C Bu No 152437  
750-LH ENG 4M LE 09582  
NOTE BUCKLED AREA  
AT 3 TO 9 O'CLOCK  
POSITIONS ON EXHAUST  
DIFFUSER





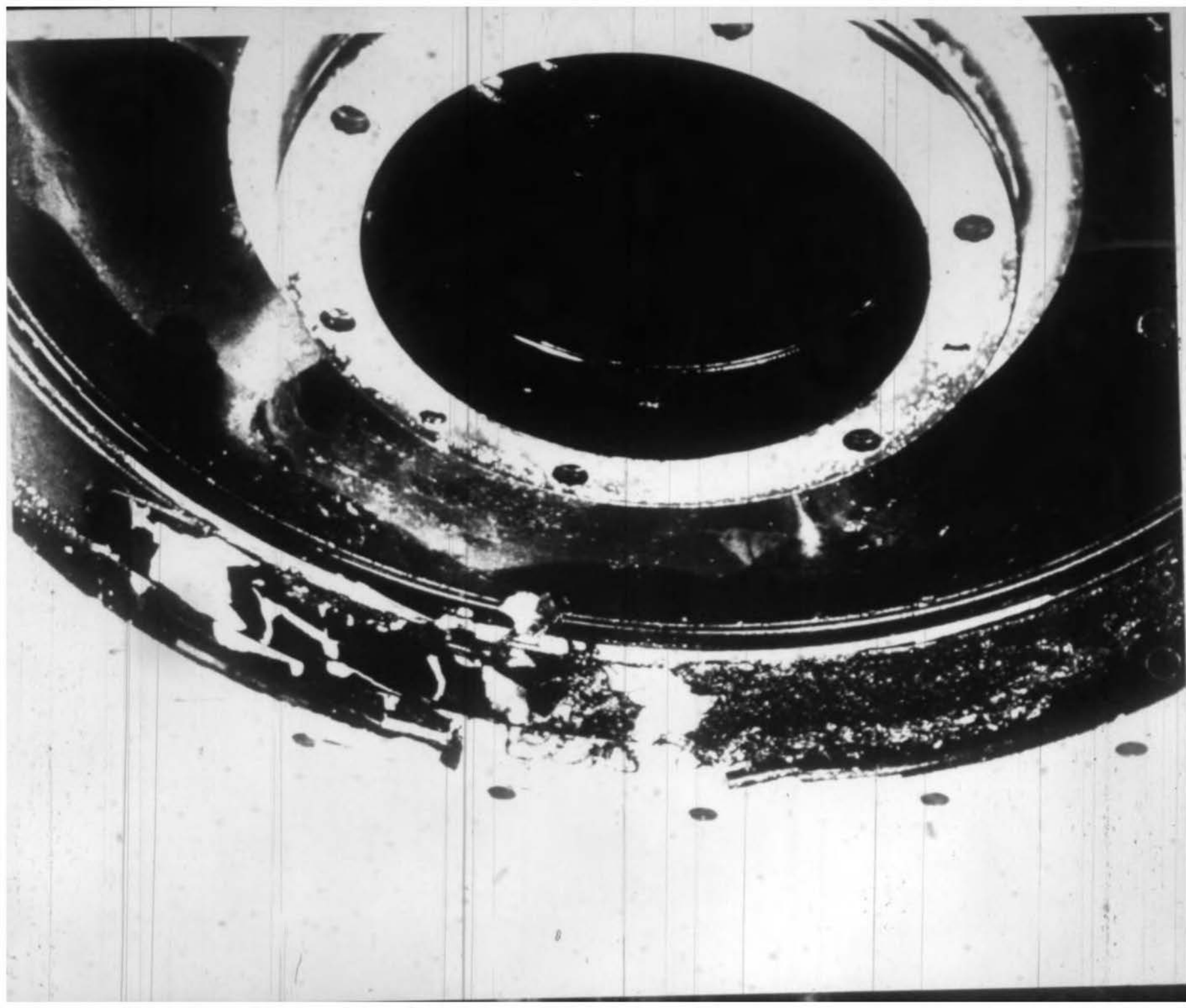






SPOT 1. HAWKING CENTRAL IN  
74-1-100000  
74-1-100000  
74-1-100000





1. OVERHAUL ACTIVITY ARAIMAC		2. REPORT NO. Q-55		3. DATE OF D/I -27-67		4. ASSEMBLY NOMENCLATURE AND PART NO. 204-040-010-7 Engine to Xmen Drive Shaft Assy		ENGINE <input type="checkbox"/>	
5. ASSEMBLY (Model) UH-1E		6. ASSEMBLY (Serial) Destroyed - Unk		7. ASSEMBLY MFR Bell		8. DATE REMOVED 4-14-67		9. REMOVED FROM (Eng No) 10. REMOVED FROM (Eng Ser)	
11. TOTAL HRS SINCE NEW Unk		12. HRS SINCE LAST D/I Unk		13. DATE LAST D/I Unk		14. LAST OVERHAUL ACTIVITY Unk		15. NO. PREV D/I'S Unk	
16. AIRCRAFT (Model) UH-1E		17. AIRCRAFT (BUNO) 152437		18. OPERATING ACTIVITY VMO-5		19. FOR EPR - AAR - I/PN/DA Aircraft Accident		20. READY FOR REMOVAL AND CODE	
21. FINDINGS <input checked="" type="checkbox"/> NO DISCREPANCY		<input type="checkbox"/> BASIC (MFG/DESIGN) DISCREPANCY		<input type="checkbox"/> NON-BASIC (MAINT/OPER) DISCREPANCY		<input type="checkbox"/> FOREIGN OBJECT DAMAGE		22. PRIMARY PART FAILURE (Part No.) COMO. ZONE	
23. DESCRIPTION OF FINDINGS (Include name and part no. of primary part failure) Microscopic and visual examination of the drive shaft revealed the failure was a result of overstress induced by compression bending and torsional forces (Incls 1 & 2). Tensile strength of the shaft was determined to be 158,000 psi. Drawing requirements are 150,000-170,000 psi. The wall thickness of the tube measured 0.083" in the area of the failure and was determined to be within specifications.								23. DISCREPANT PARTS (Part No.) COMO.	
27. CONCLUSIONS Damage to the drive shaft was the result of ground impact forces.								24. PERTINENT BULLETINS, CHANGES, ETC., INCORPORATED NUMBER YES NO	
28. RECOMMENDATIONS None									
29. REQUESTED BY NAVAIRSYSCOMREPPHCLA		30. REQUESTED USCREEPAC No. 2409-67		31. TITLE Equipment Specialist (Aircraft)		32. DATE 15 May 67		33. APPLICABLE INCORPORATED	

DISASSEMBLY AND INSPECTION REPORT NAVJEP3 FORM 4730/2 (11-61)

REPORT SYMBOL BUJEP3 4730-2

(b) (6)

CERTIFIED TRUE COPY

VMO-5 AAR 1-67A, of 14 APRIL 1967, UH1E BUNO 152437, PILOT GREENLEES  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

ENCLOSURE (1)







1. ORIGINAL ACTIVITY <b>ASAPAC</b>		2. REPORT NO. <b>Q-55</b>	3. DATE OF R/T <b>4-27-67</b>	4. ASSEMBLY NOMENCLATURE AND PART NO. <b>Transmission, 204-040-009-55</b>		ENGINE <input type="checkbox"/>																
5. ASSEMBLY (Model) <b>UH-1E</b>		6. ASSEMBLY (Serial) <b>A12-1420</b>	7. ASSEMBLY MFR <b>Pell</b>	8. DATE REMOVED <b>4-14-67</b>	9. REMOVED FROM (Eng Ser) <b></b>	10. REMOVED FROM (Eng Ser) <b></b>																
11. TOTAL HRS SINCE NEW <b>Unk</b>	12. HRS SINCE LAST R/T <b>Unk</b>	13. DATE LAST R/T <b>Unk</b>	14. LAST OVERHAUL ACTIVITY <b>Unk</b>		15. NO. PREV R/T'S <b>Unk</b>	16. AIRCRAFT (Model) <b>UH-1E</b>																
17. OPERATING ACTIVITY <b>VMO-5</b>		18. PUR - EPR - AAR - I/PN/UA <b></b>		19. REASON FOR REMOVAL AND CODE <b>Aircraft Accident</b>		20. AIRCRAFT (BUNO) <b>152437</b>																
21. FINDINGS <input checked="" type="checkbox"/> DISCREPANCY		<input checked="" type="checkbox"/> BASIC (MFG/DESIGN) DISCREPANCY		<input checked="" type="checkbox"/> NON-BASIC (MAINT/OPER) DISCREPANCY		<input type="checkbox"/> FOREIGN OBJECT DAMAGE																
22. DESCRIPTION OF FINDINGS (Include name and part no. of primary part involved)																						
<p>a. Many of the transmission gears were missing. The upper planetary gears, P/N 204-040-360-1, adapter, P/N 204-040-117-3, and sun gear, P/N 204-040-330-1, were not received (Incl 1).</p> <p>b. The oil pump drive shaft was bent when the drive shaft was bent when the drive and susp case separated on impact (Incl 2).</p> <p>c. The transmission input quill seal, P/N 455-42H, and the alignment roller bearing, P/N 204-040-260-3, were not damaged by fire. These components were torn out of the transmission main case on impact (Incl 3).</p> <p>d. Marks were noted on the transmission case input quill mounting pad. The marks appeared to have been made by the cooling fins on the forward end of the drive shaft (Incl 4).</p>																						
<table border="1"> <tr> <td colspan="2">23. PRIMARY PART FAILURE (Part No.)</td> <td>COND.</td> <td>LINE</td> </tr> <tr> <td colspan="2">24. DISCREPANT PARTS (Part No.)</td> <td colspan="2">COND.</td> </tr> <tr> <td colspan="2">25. PERTINENT BULLETINS, CHANGES, ETC., INCORPORATED</td> <td colspan="2"></td> </tr> <tr> <td>NUMBER</td> <td>YES</td> <td colspan="2">NO</td> </tr> </table>							23. PRIMARY PART FAILURE (Part No.)		COND.	LINE	24. DISCREPANT PARTS (Part No.)		COND.		25. PERTINENT BULLETINS, CHANGES, ETC., INCORPORATED				NUMBER	YES	NO	
23. PRIMARY PART FAILURE (Part No.)		COND.	LINE																			
24. DISCREPANT PARTS (Part No.)		COND.																				
25. PERTINENT BULLETINS, CHANGES, ETC., INCORPORATED																						
NUMBER	YES	NO																				
26. PRIORITY <input checked="" type="checkbox"/> DIS		REQUESTED BY <b>NAVAIRSYSCOMREPPACIA</b>		REFERENCE <b>NASCHREPPAC No. 2409-67</b>		27. WHEN <b>114</b>																
(b) (6)				28. TITLE <b>Equipment Specialist (Aircraft)</b>		29. DATE <b>18 May 67</b>																
30. SUMMARY AND INSPECTION REPORT NAVJEPs FORM 4730/2 (11-61)																						

**CERTIFIED TRUE COPY**

e. The broken teeth on the input drive bevel gear mesh with the marks on the input driven bevel gear. It is suspected that the driven gear shaft struck the drive gear teeth and shaft when the transmission main case disintegrated on impact (Incls 5-7).

f. Teeth marks on the bearing support assembly, P/N 204-040-321-1, indicate that contact was made with the tail rotor offset drive pinion gear, P/N 204-040-762-1, when the main input gear quill was torn out of the transmission case (Incl 8).

g. The aft top side of the ring gear mounting flange was bent downward and the right side of the mounting bracket for the synchronized elevators and forward control linkage was broken off in the bolt hole (Incl 9).

27. Conclusions: Damage to the transmission was caused by ground impact forces or excessive heat from the post crash fire.

28. Recommendations: None

VMO-5 AAR 1-67A, of 14 APRIL 1967, UH1E BUNO 152437, PILOT GREENLEESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

ENCLOSURE (12)

RECEIVED  
JAN 10 1964  
U.S. DEPARTMENT OF AGRICULTURE  
WASHINGTON, D.C.







SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH COMNAVINST  
3750.6 SERIES.  
VMA-5 AAR-1-07A, 14 April 1967  
UH-1H, Para 6.152237, Pilot's CHECKLIST

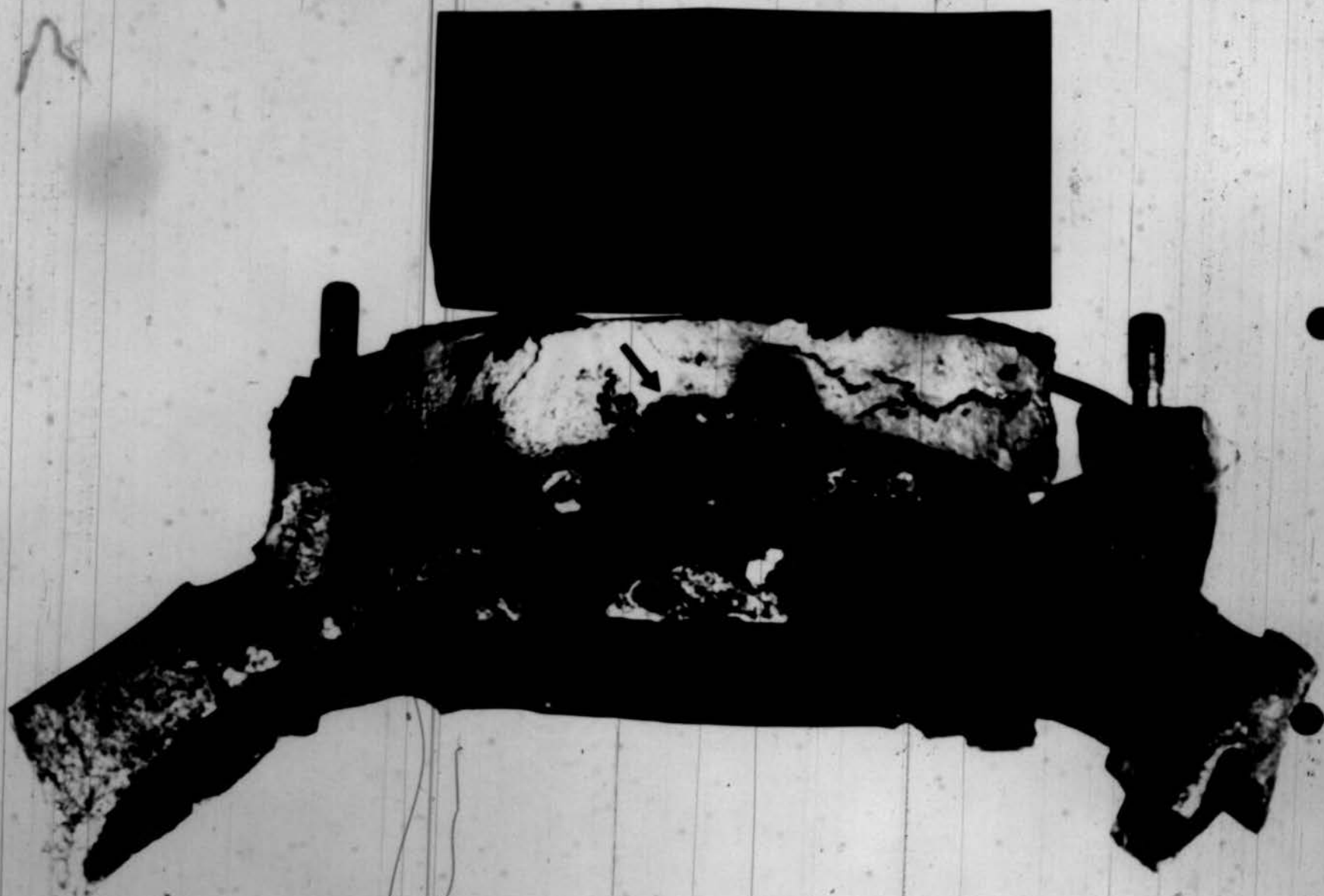


3750.6 SERIES  
 TRAILER  
 QUILL SHAFT  
 MOUNT POLICE BEARING  
 FROM INPUT QUILL SHAFT

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH CONVENTION  
 3750.6 SERIES.

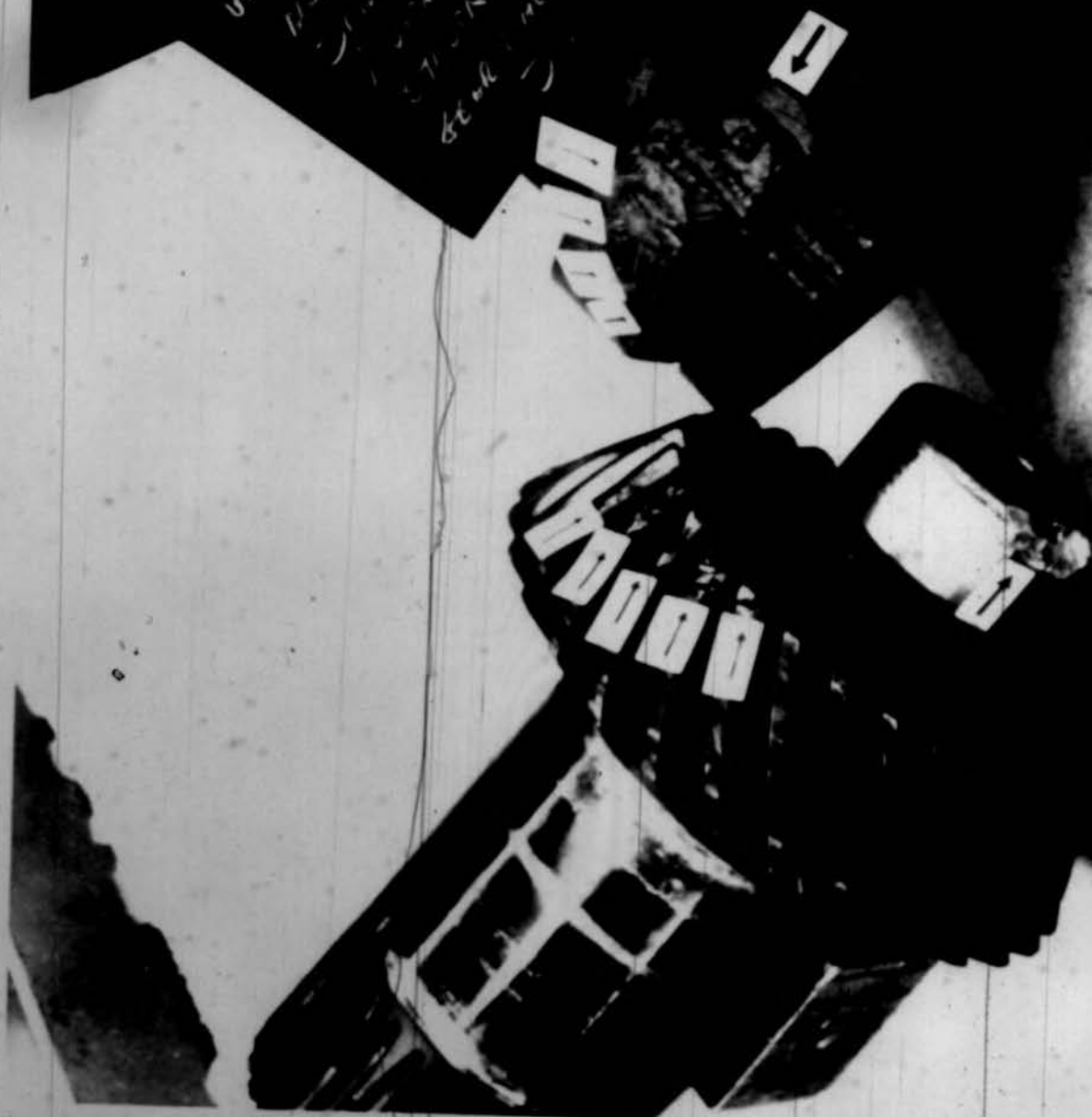
VMO-5 AAR-1-67A, 12 April 1967

UN-12, P.No. 152477, File: GRENCH





U2-12 K/C 301-60-37  
HARRIS on the  
JAMES EARL RAY  
I think the  
Frank

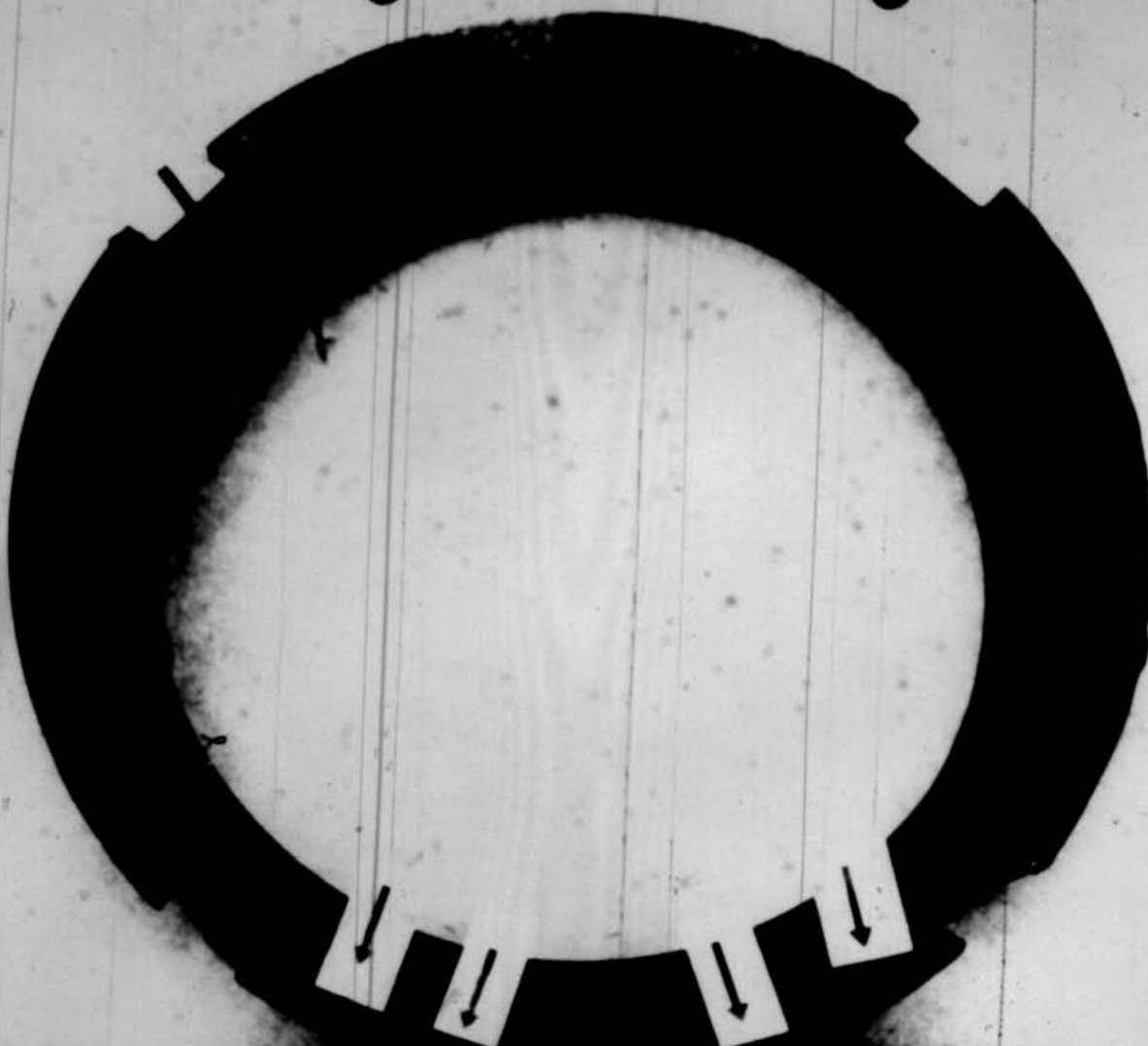




STATION HANDLING REQUIRED IN ACCORDANCE WITH OPERATING.  
DATE: 11 April 1967  
TIME: 11:00 AM, 11:00 AM, 11:00 AM







SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH COMNAVINST.  
3750.6 SERIES.

WMO-5 AAR-1-67A, 14 April 1967

UH-1E, PNO. 152277, Pilot GREENHORN

U.S. AIR FORCE 152427

THE T-28 WAS

DOWN IN THE

WETLANDS OF THE

IN THE AREA OF THE

WAS BENT

7. OVERHAUL ACTIVITY APADMAC		8. REPORT NO. Q-55		9. DATE OF RPT -27-67		10. ASSEMBLY NOMENCLATURE AND PART NO. Pylon Installation, 540-200-002-5		ENGINE	
11. ASSEMBLY (Model) UH-1E		12. ASSEMBLY (Serial) N/A		13. ASSEMBLY MFR Bell		14. DATE REMOVED -14-67		15. REMOVED FROM (Eng Ser) 16. REMOVED FROM (Eng Ser)	
17. TOTAL HRS SINCE MFR Unk		18. HRS SINCE LAST O/M Unk		19. DATE LAST O/M Unk		20. LAST OVERHAUL ACTIVITY Unk		21. NO PREV O/M'S Unk	
22. AIRCRAFT (Model) UH-1E		23. AIRCRAFT (S/N) 15P437		24. OPERATING ACTIVITY VVO-5		25. PUR-SPR-AAR-1/PN/SM		26. REASON FOR REMOVAL AND CODE Aircraft Accident	
27. FINDINGS <input checked="" type="checkbox"/> NO DISCREPANCY		<input type="checkbox"/> BASIC MFG/DESIGN DISCREPANCY		<input type="checkbox"/> NON-BASIC (MFG/DESIGN) DISCREPANCY		<input type="checkbox"/> FOREIGN OBJECT DAMAGE		28. PRIMARY PART FAILURE (Part No.) COND. ZONE	
29. DESCRIPTION OF FINDINGS (Include name and part no. of primary part failure)								30. DISCREPANT PARTS (Part No.) COND.	
<p>a. The stabilizer bar, P/N 540-811-300-7, S/N 1067, support on the red blade side was distorted and the bolts were loose. The distortion was toward the white blade (Incl 1).</p> <p>b. The retention bolts in the stabilizer bar support on the white blade side were sheared (Incl 2).</p> <p>c. The center frame of the stabilizer bar was bent toward the white blade (Incl 3).</p> <p>d. Both drag links and trailing edge of both blades were twisted downward. Laminations on the bottom of the white blade were peeled downward at the grip area while the laminations on the top of the blade were still intact. The laminations were peeled back on the top and bottom of the red blade (Incls 4 &amp; 5).</p>									
31. PRIORITY DTR		32. REQUESTED BY NAVAIRSYSCOM/REFF/CIA		33. REFERENCE NASCREPPAC 2409-67		34. APPLICABLE YES INCORPORATED		35. DATE 16 May 67	
36. SIGNATURE				37. TITLE Equipment Specialist (Aircraft)					

(b) (6)

## DISASSEMBLY AND INSPECTION REPORT NAVJEPB FORM 4750/2 (11-61)

REPORT SYMBOL DUNEPS 4730-2

- e. The white blade pitch link was bent at the pitch horn attachment (Incl 6). No distortion was noted on the red blade pitch link (Incl 7).
- f. Both stabilizer bars failed toward the white blade (Incl 8). Fracture of the stabilizer bars was a result of bending overstress (Incls 9 & 10).
- g. The red and white blade damper control tube fractures were a result of bending overstress. Both damper control levers were bent opposite the direction of rotation indicating that the damper control tubes were still attached during the impact sequence (Incls 11-14).
- h. The red and white blade control tubes were bent opposite the direction of rotation. Fractures on the control tubes were a result of bending overstress (Incls 15 & 16).
- i. The yoke, P/N 540-011-102-7, was twisted and bent upward on the white blade side of the yoke (Incls 4 & 5).

(b) (6)

**CERTIFIED TRUE COPY**

VMO-5 AAR 1-67A, on 14 APRIL 1967, UH1B BUONO 152437, PILOT GREENLEESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

ENCLOSURE (13)



PRIORITY

Q-55, UH-1E, S/N 152437

j. The white blade grip nut, P/N 540-011-177-1, had only minor damage which was caused by the white blade butt swinging in the grip when the trailing edge of the blade failed in the drag link area on impact (Incl 17).

k. The red blade grip nut, P/N 540-011-117-1, was severely damaged by the red blade butt. The nut had to be cut with a high speed cutting wheel to relieve the pressure on the threaded area and then removed with a socket wrench and a four foot extension handle (Incl 18).

l. A normal twist was noted on the red blade tension torsion strap, P/N 204-012-112-7, S/N 888, while the white blade strap, P/N 204-012-112-7, S/N 593, was abnormally twisted (Incl 19).

m. The roll pins, P/N MS9048-104, were sheared in the levers, P/N 540-011-469-1, and shafts, P/N 540-011-471-1, on the static stops.

n. Examination of the lower pylon revealed that the six bolts in the scissors and sleeve hub assembly had failed through overstress induced by tension and shearing forces. No evidence of progressive type failures were noted (Incl 20).

o. Microscopic examination of the cracked nut, P/N AN320-12, removed from the scissors and sleeve assembly revealed that the fracture surfaces were bright and crystalline in nature, typical of aluminum embrittled steel. The nut was apparently subjected to molten aluminum at high temperatures during the post crash fire which allowed penetration and alloying of the aluminum with the steel nut. The nut apparently cracked upon cooling under tension stresses. No progressive type failures were noted upon examination of the fracture surfaces (Incl 21).

p. Microscopic and visual examination of the burned inner ring horn revealed that the horn failed because of static overstress under a bending force acting in an upward direction as indicated by localized plastic deformation in the fracture area. No progressive type failures were noted (Incl 22).

q. Microscopic examination of the remaining portion of the fire damaged swashplate support fracture surfaces revealed that failure of the assembly resulted because of bending and tension overstress apparently induced by impact forces. No evidence of progressive type failures were noted (Incl 23).

r. Removal of the swashplate and scissors assembly revealed that approximately 1 1/4" of the friction sleeve was showing above the collet set (Incl 24).

s. The collective sleeve was dented by contact with the swashplate assembly at the time of blade impact (Incls 25 & 26).

t. The mast was distorted by contact with the yoke on the red blade side (Incl 27).

u. The teflon bearings in the blade grips and bearing housings were satisfactory.

v. The trunnion was centered perfectly with the yoke.

27. Conclusions: Damage noted on the pylon installation was a result of ground impact.

28. Recommendations: None

ALL INFORMATION CONTAINED  
HEREIN IS UNCLASSIFIED  
DATE 12/1/88 BY 1045  
DISTRICT.

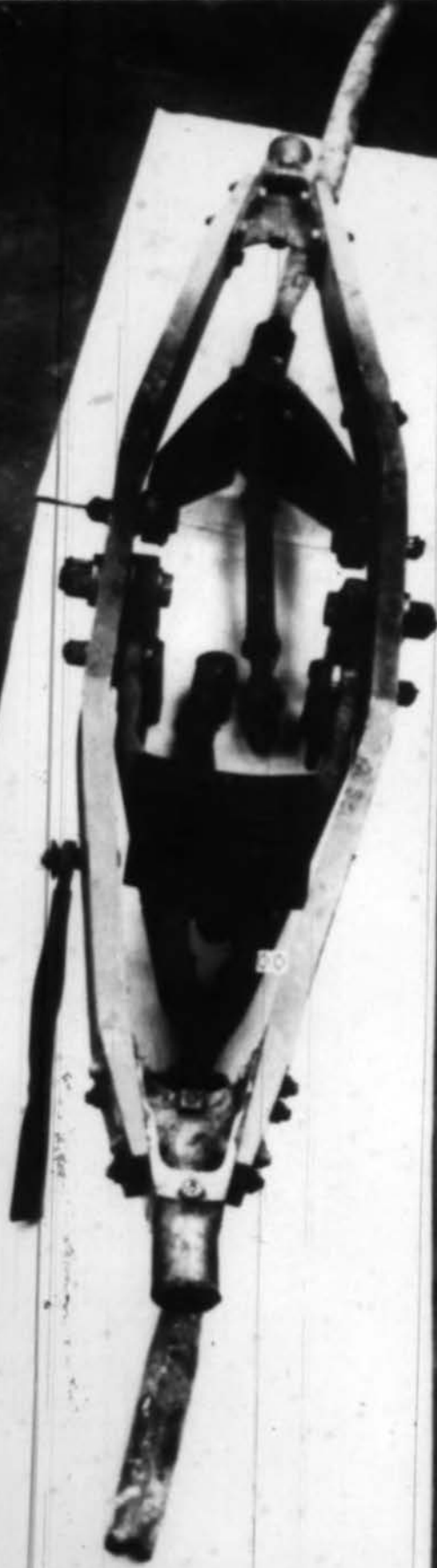
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.  
VMD-5 AAR-1-67A, 14 April 1967  
UH-1E, BuNo. 152437, Pilot GREENLEESE

ENCLOSURE (1)



UH-1E A/C Bu No 152437  
White BLADE Side  
The fan from Bolts  
Discovered

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.  
VMO-5 AAR-1-67A, 14 April 1967  
UH-1E, BuNo. 152437, Pilot GREENLESE



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH SPNAVINST.  
3750.6 SERIES.

VMO-5 AAR-1-67A, 14 April 1967

UH-1E, BuNo. 152437, Pilot GREENL.ESSE



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.

VMO-5 AAR-1-67A, 14 April 1967

UH-1E, BuNo. 152437, Pilot GREENLEESE


ENCLOSURE 4





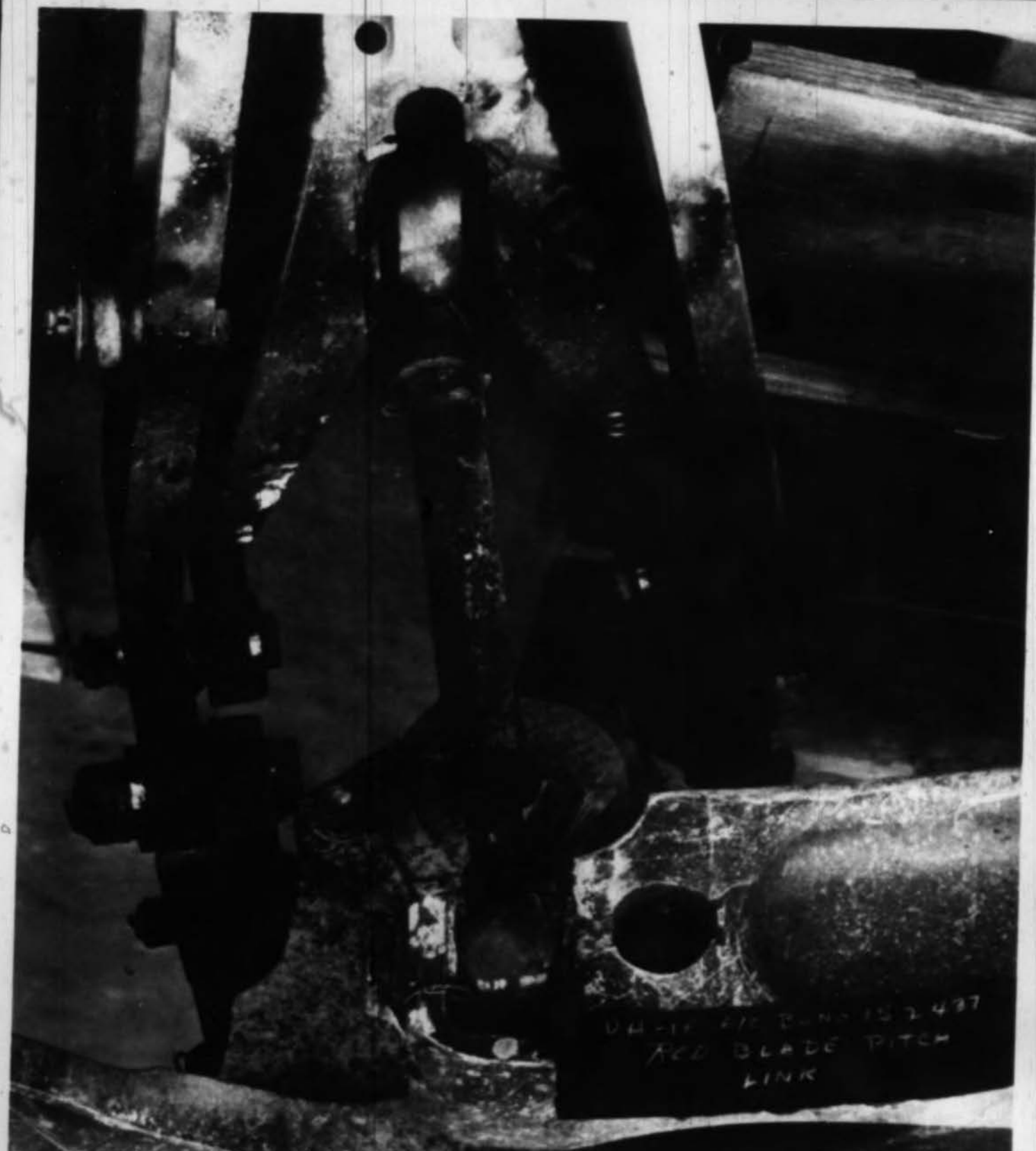
ENCLOSURE (5)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.  
VMO-5 AAR-1-67A, 14 April 1967  
UH-1E, BuNo. 152437, Pilot GREENLEESE



UH-1E A/C BU NO 152437  
WHITE BLADE PITCH  
LINK

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.  
VMO-5 AAR-1-67A, 14 April 1967  
UH-1E, BuNo. 152437, Pilot GREENLESE



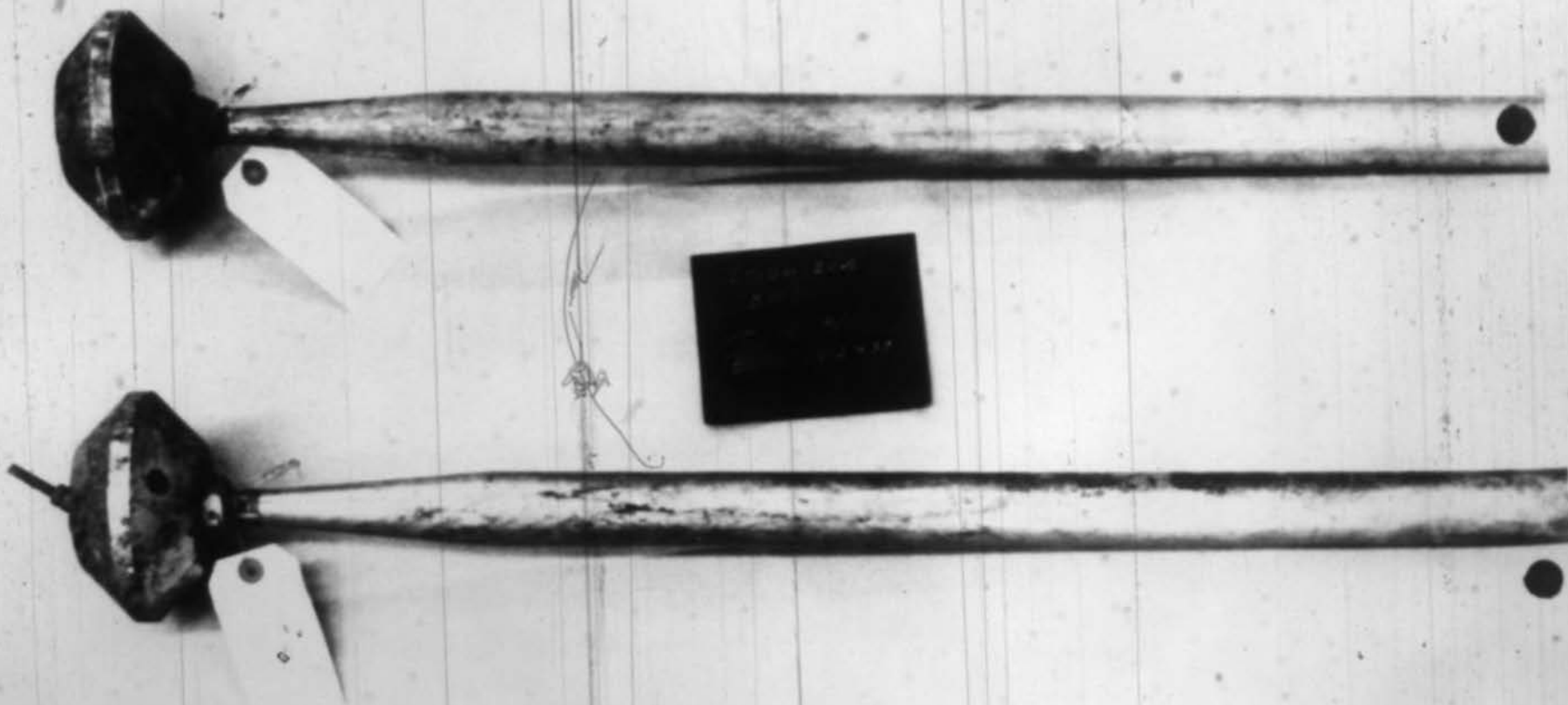
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.

VMO-5 AAR-1-67A, 14 April 1967

UH-1E, BuNo. 152437, Pilot GREENLESE

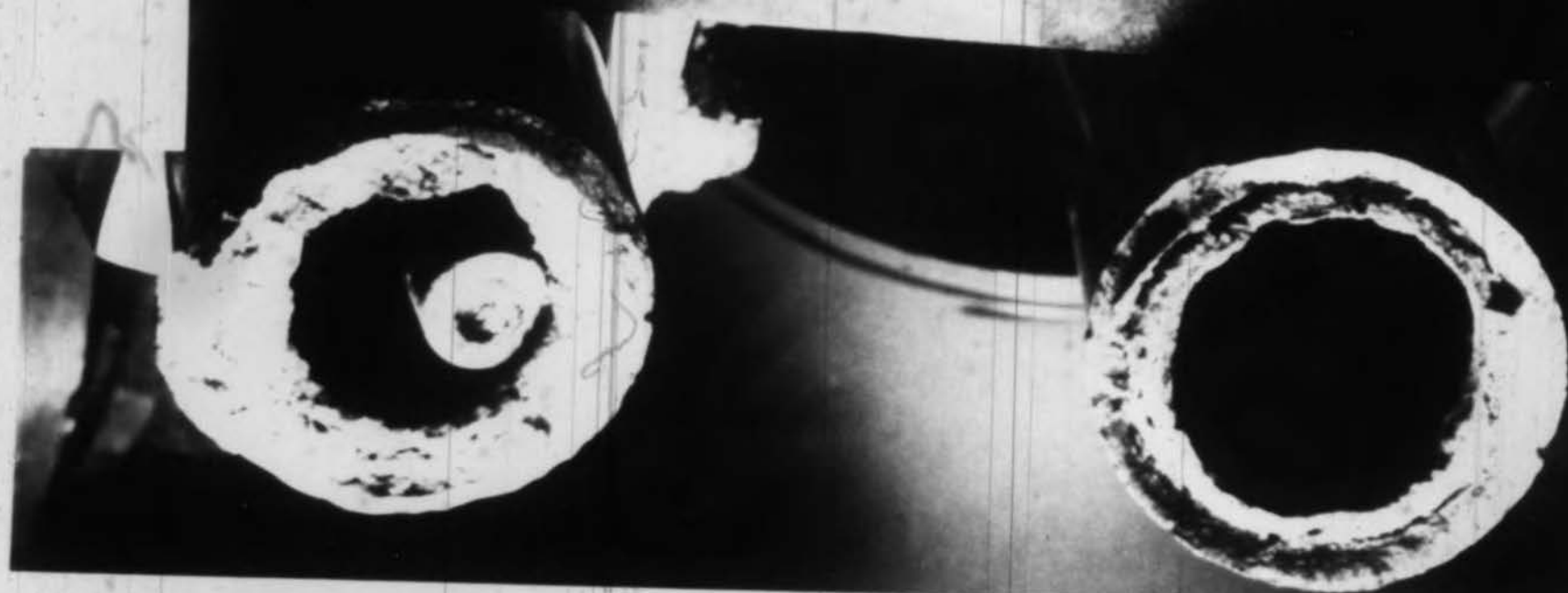
ENCLOSURE (2)



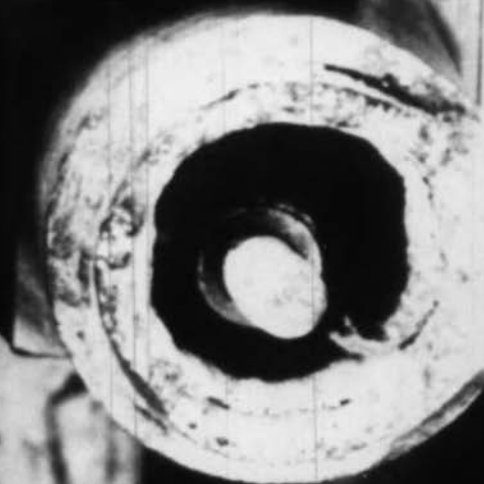
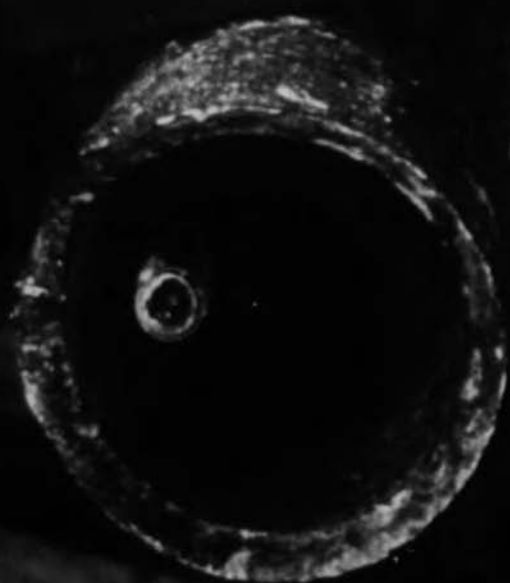


SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH COMNAVINST.  
3750.75 SERIES.  
VMA-5 AAR-1-67A, 14 April 1967  
UH-1B, BuNo. 152437, Pilot GREENBERG

UH-1E A/C Bu No 152437  
FRACTURE ON  
WHITE BLADE  
STABILIZER BAR



UH-1E A/C BU NO 152437  
FRACTURE ON  
RED BLADE  
STABILIZER BAR



SPECIAL HANDLING REQUIRED IN ACCORDANCE  
375.6 SERIES.  
VM-5 AIR-5-7A, 14-00000000  
UH-1E, 152437, 152437, 152437

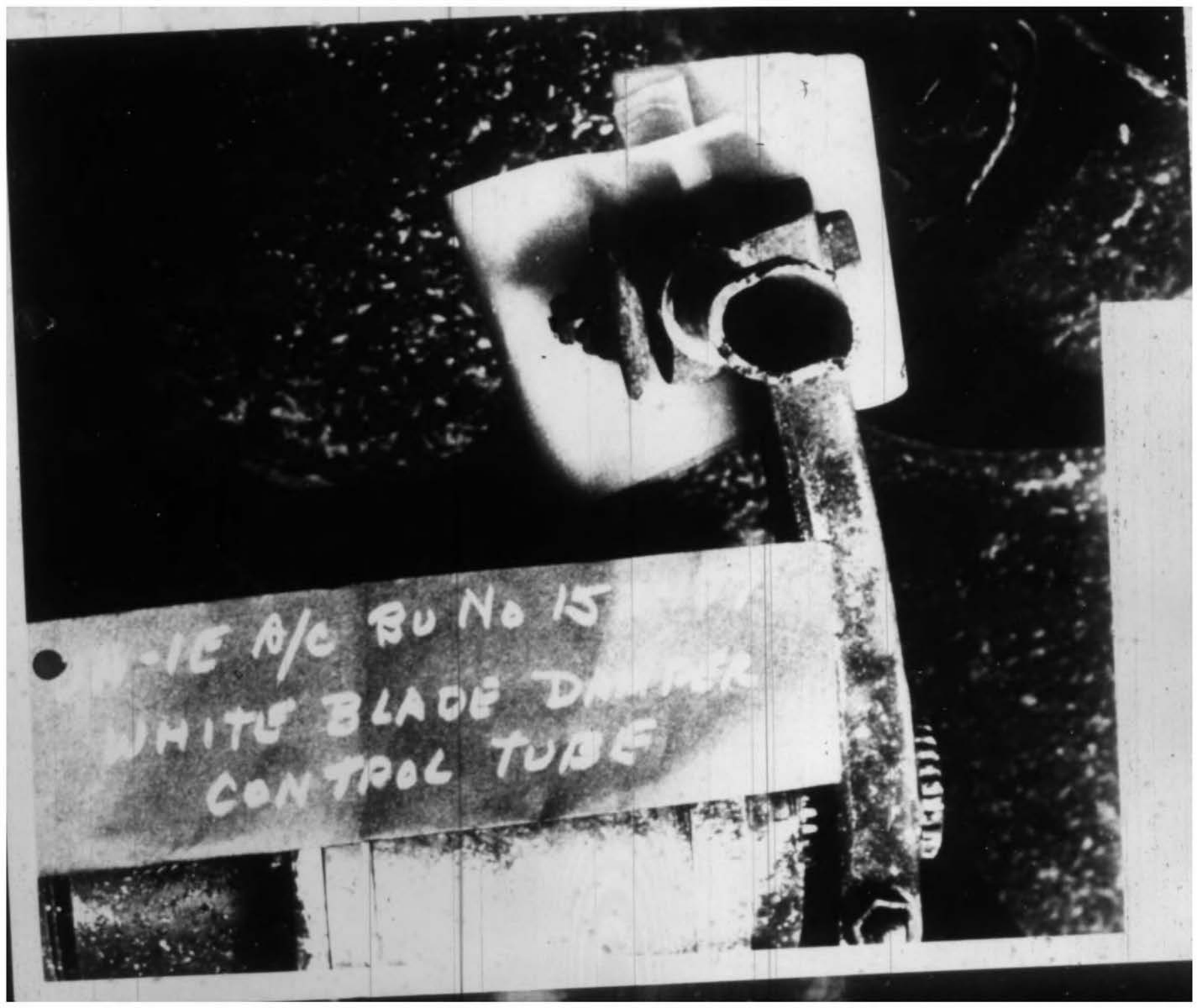


UH-1C A/C BU No 152437  
RED. BLADE DAMPER  
CONTROL TUBE



UH-1C A/C BU No 152437  
RED BLADE DAMPER  
CONTROL TUBE





W-1E A/C BU No 15  
WHITE BLADE DRIVER  
CONTROL TUBE



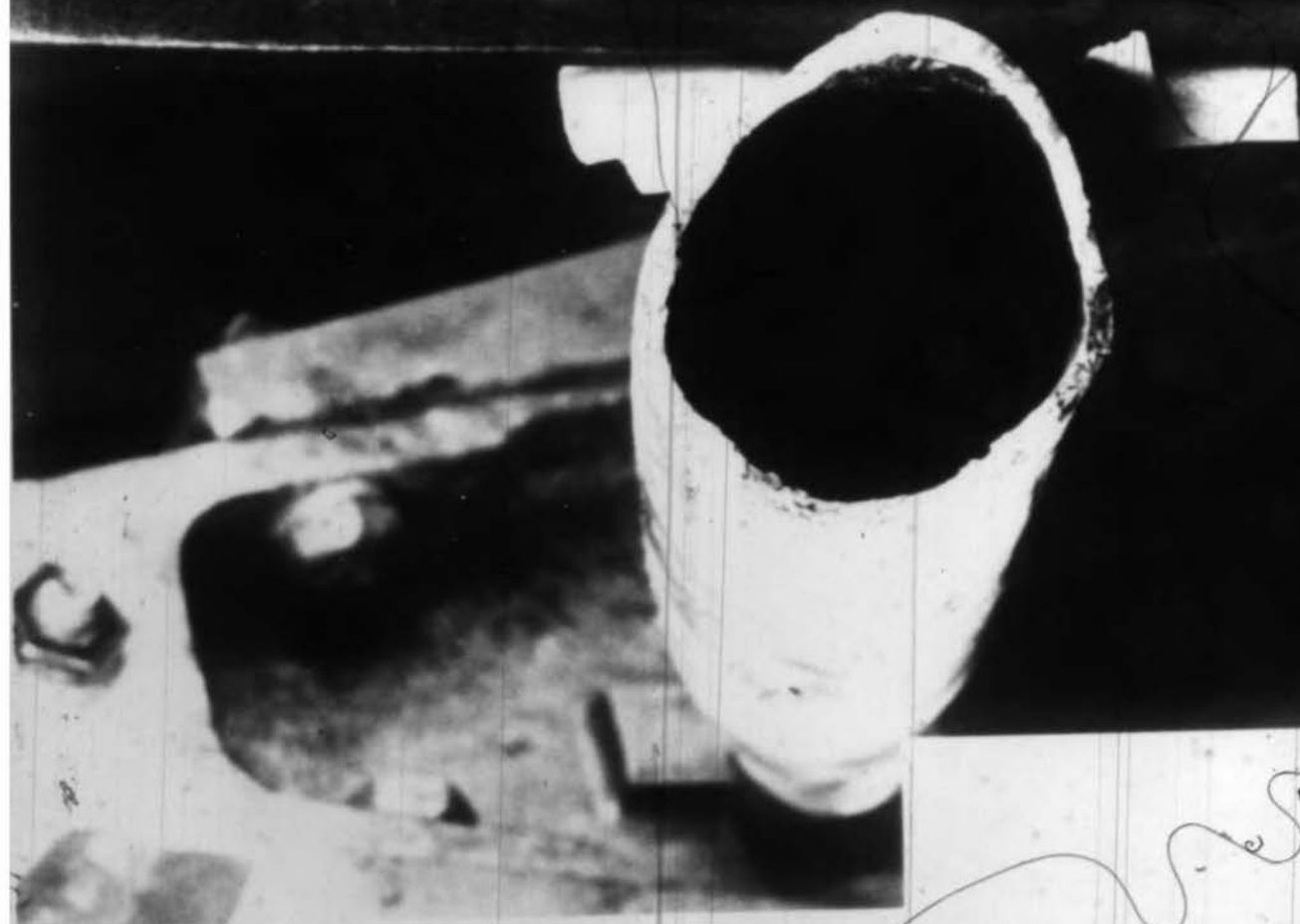
UH-1E A/C BU NO 152437  
WHITE BLADE DAMPER  
CONTROL TUBE



VH-1E A/c BU No 152437  
RED BLADE CONTROL  
TUBE FRACTURE



UH-1E A/c BU No 152437  
WHITE BLADE CONTROL  
TUBE FRACTURE







UH-1E A/C Bu No 152437  
GRID NUT ON WHITE  
BLADE HAD ONLY MINOR  
DAMAGE





RED  
BLADE

WHITE  
BLADE

ENCLOSURE 19

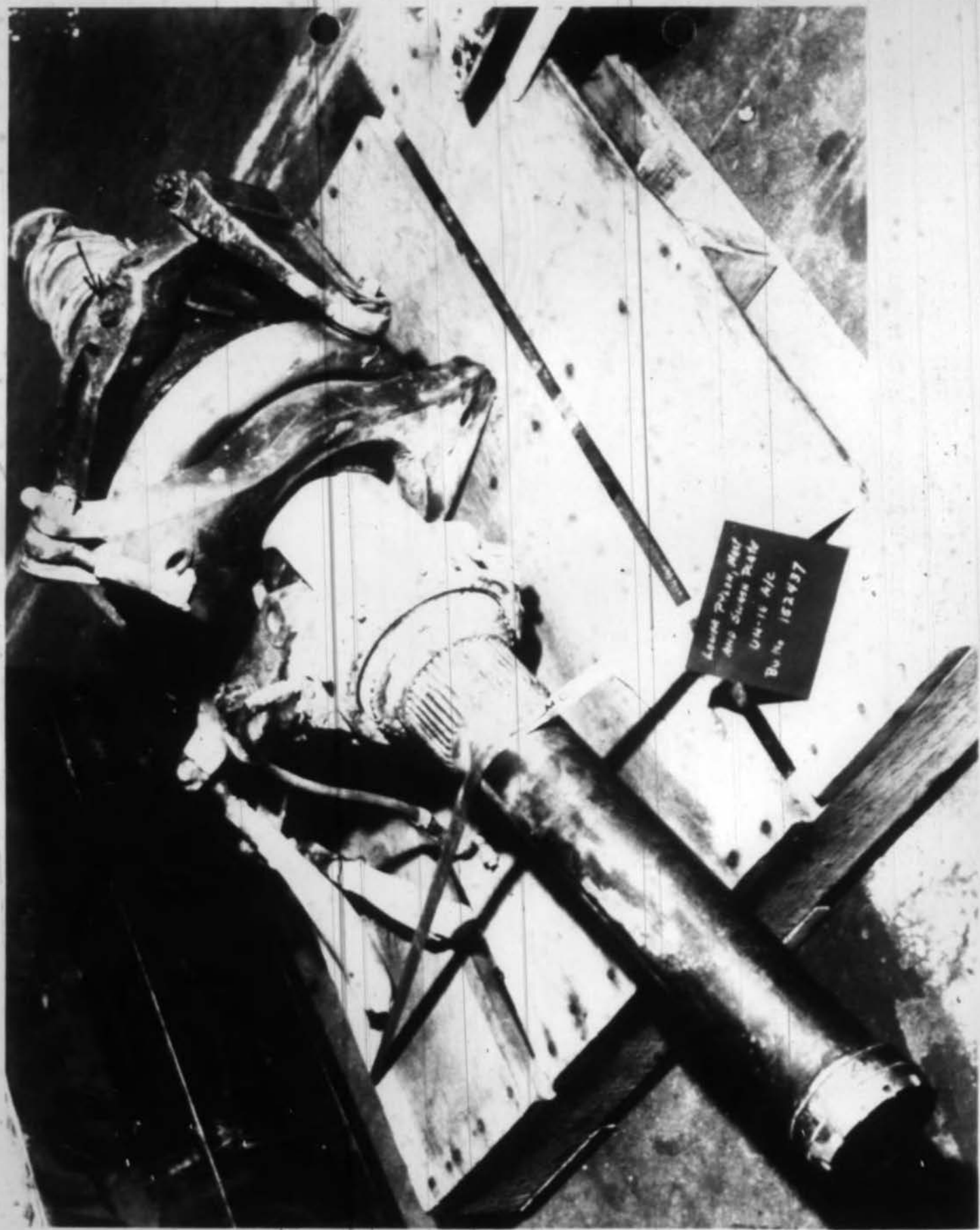
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH COMNAVINST.  
3750.6 SERIES.  
VMO-5 AAR-1-67A, 14 April 1967  
UH-1E, BuNo. 152437, Pilot GREENHOUSE





LEWIS PULLEY, MAF  
AND SURE 244W  
UNIT-16 A/C  
Bu No 152437

SPENT 1/2 HOURS REPAIRING INFLATOR...  
754.0 31.125.  
WALL 4.0 31.125, 12.0 31.125  
12.0 31.125, 12.0 31.125, 12.0 31.125



UN-1E A/C BU NO 152437  
AFT FITTING ON INNER  
RING FRACTURED ON  
SWASH PLATE AND SUPPORT  
1554.







UH-1E A/C BU No 152437  
SWASH PLATE SUPPORT  
FRACTURED

UH-1E A/C BU No 152437

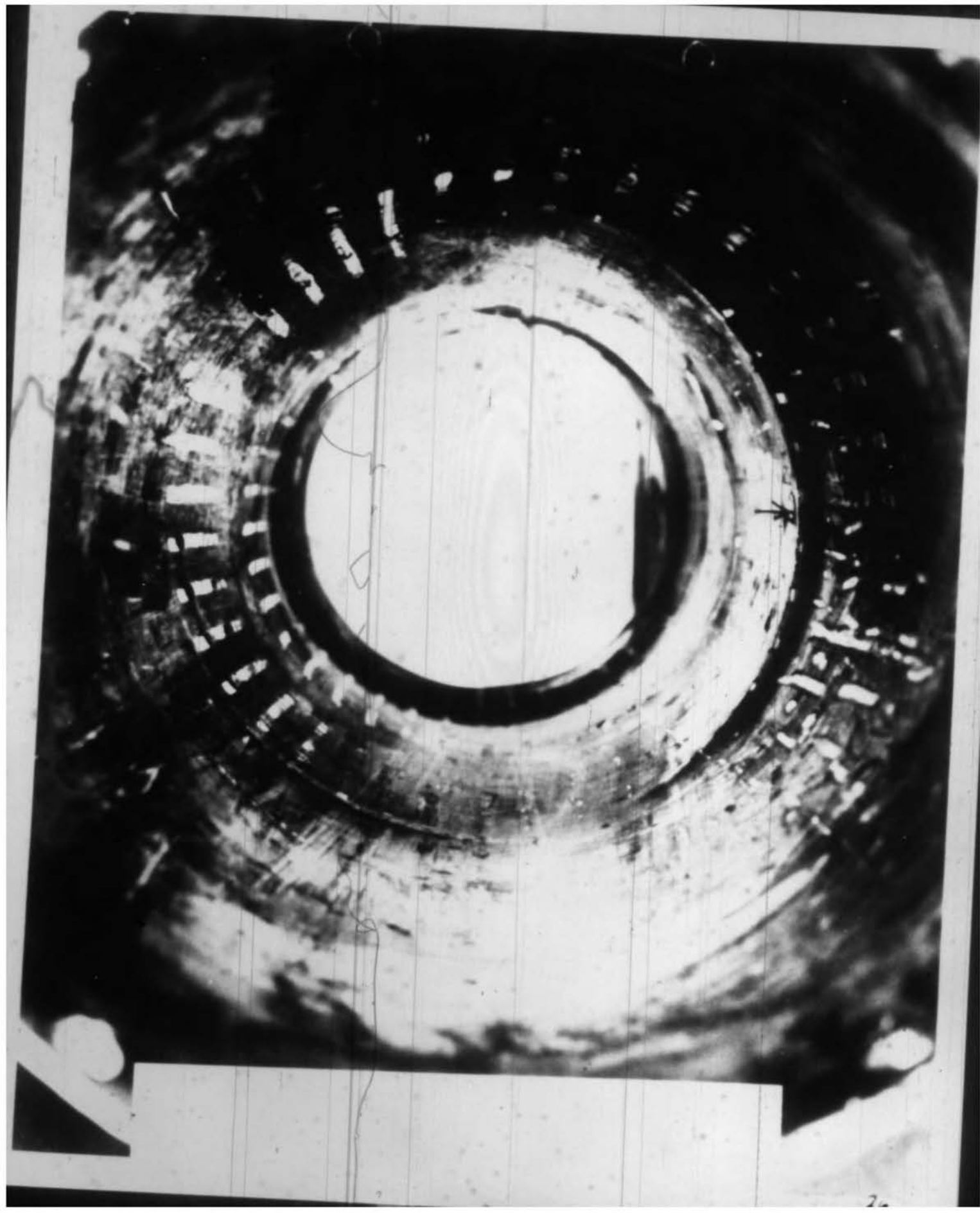
APPROXIMATELY 1 1/4 INCHES  
OF THE FRICTION SLEEVE  
WAS SHOWING ABOVE THE  
COLLET SET

21731

Metalphoto Corporation









UH-1E H/C BU NO 152437

NOTE EXCESSIVE MAST  
BUMPING ON RED BLADE  
SIDE CAUSED DISTORTION  
OF THE MAST

1. OVERHAUL ACTIVITY		2. REPORT NO.		3. DATE OF RPT		4. ASSEMBLY NOMENCLATURE AND PART NO.		PRIORITY	<input type="checkbox"/>
ARADMAC		6-58		4-27-67		Hydraulic Flight Controls			
5. ASSEMBLY (Model)		6. ASSEMBLY (Serial)		7. ASSEMBLY WPN		8. DATE MOVED		9. REMOVED FROM (Eng Snd)	
UH-1E		Destroyed				4-17-67			
10. TOTAL HRS SINCE NEW		11. HRS SINCE LAST O/M		12. DATE LAST O/M		13. LAST OVERHAUL ACTIVITY		14. NO PREV O/M'S	
Unk		Unk		Unk		Unk		Unk	
15. OPERATING ACTIVITY		16. FLW - SPR - ARR - L/FM/GA		17. REASON FOR REMOVAL AND CODE		18. AIRCRAFT (Model)		19. AIRCRAFT (RNDG)	
VMO-5				Aircraft Accident		UH-1E		152437	
20. FINDINGS		BASIC DISCREPANCY		NON-BASIC DISCREPANCY		FOREIGN OBJECT DAMAGE		21. PRIMARY PART FAILURE (Part No.)	
<input checked="" type="radio"/> YES <input type="radio"/> NO		<input type="radio"/> BASIC DISCREPANCY		<input type="radio"/> NON-BASIC DISCREPANCY		<input type="radio"/> FOREIGN OBJECT DAMAGE		<input type="radio"/> COND <input type="radio"/> FINE	
22. DESCRIPTION OF FINDINGS (Include name and part no. of primary parts involved)								23. DISCREPANT PARTS (Part No.)	
a. The hydraulic flight controls were severely damaged by fire and impact (Incl 1).									
b. Microscopic examination revealed that the fractures noted on the controls were caused by stress as a result of tension was bending at the time of ground impact.									
c. X-ray of the controls revealed no appreciable discrepancies.									
24. Conclusions: Damage to the controls was a result of ground impact forces and excessive heat from the post crash fire.								25. PERTINENT BULLETINS, CHANGES, ETC., INCORPORATED	
								NUMBER YES NO	
26. RECOMMENDATIONS		None		REFERENCE		27. APPLICABLE		28. DATE	
				NAVAINSTOCOMREPYNOLA		HYDRAFLAC MOL 2409-67		19 May 67	
29. SIGNATURE		(b)(6)		30. TITLE		Equipment Specialist (Aircraft)			

DISASSEMBLY AND INSPECTION REPORT NAVJEPNS FORM 4730/2 (11-61)      REPORT SYMBOL DUNEPS 4730-

~~PRIORITY~~

ARADMAC

Q-135

1-27-67

Hydraulic Flight Controls

### 3. *AVS (code: F (Model))*

Destroyed

7-17-67

11. TOTAL NO. OF  
 12. SINGLES ONLY  
 13. 12

MRB 2-1402  
LAST QTR  
Only

DATE LAST  
1/76

7	Q15.1.10
8	Q15.1.11

5. 615. 100  
2/10/0

4. AIRCRAFT

17. AIRCRAFT (BOMB)

10.  $\text{DPBMA}^{\text{TM}}(\text{MS}) \text{ KCl} \cdot \text{F} + \text{W} + \text{F}$ 

19. FURN. ETC. - 4.00 - 1/10/64

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**BASIC**  
(new version)

2

676-8X51C  
100-10000

7

100

22. PLACEMENT PART FAMILIES  
( $\mathbb{R}_n \times \mathbb{R}_n$ )

TABLE 1

14. DESCRIPTION OF FINDINGS (include name and part no. of primary part)

8. Macroscopic examination revealed that the fractures noted on the controls were caused by over stress as a result of tension was bending at the time of impact.

c. X-ray of the controls revealed no statistically significant discrepancies.

27. Conclusions: Damage to the controls was a result of ground impact forces and excessive heat from the post-crash fire.

None

**PRIORITY**

REQUESTED BY			
NAME	TELEPHONE	ADDRESS	

● 中国书画函授大学肇庆分校

MASS TAC No. 21-07-67

2000

APPLICABLE	
------------	--

INCORPORATED

55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1050 1051 1052 1053 1054 1055 1056 1057 1058 1059 1060 1061 1062 1063 1064 1065 1066 1067 1068 1069 1070 1071 1

19 May 67

(b) (6)

Equipment Specialist (Aircraft)

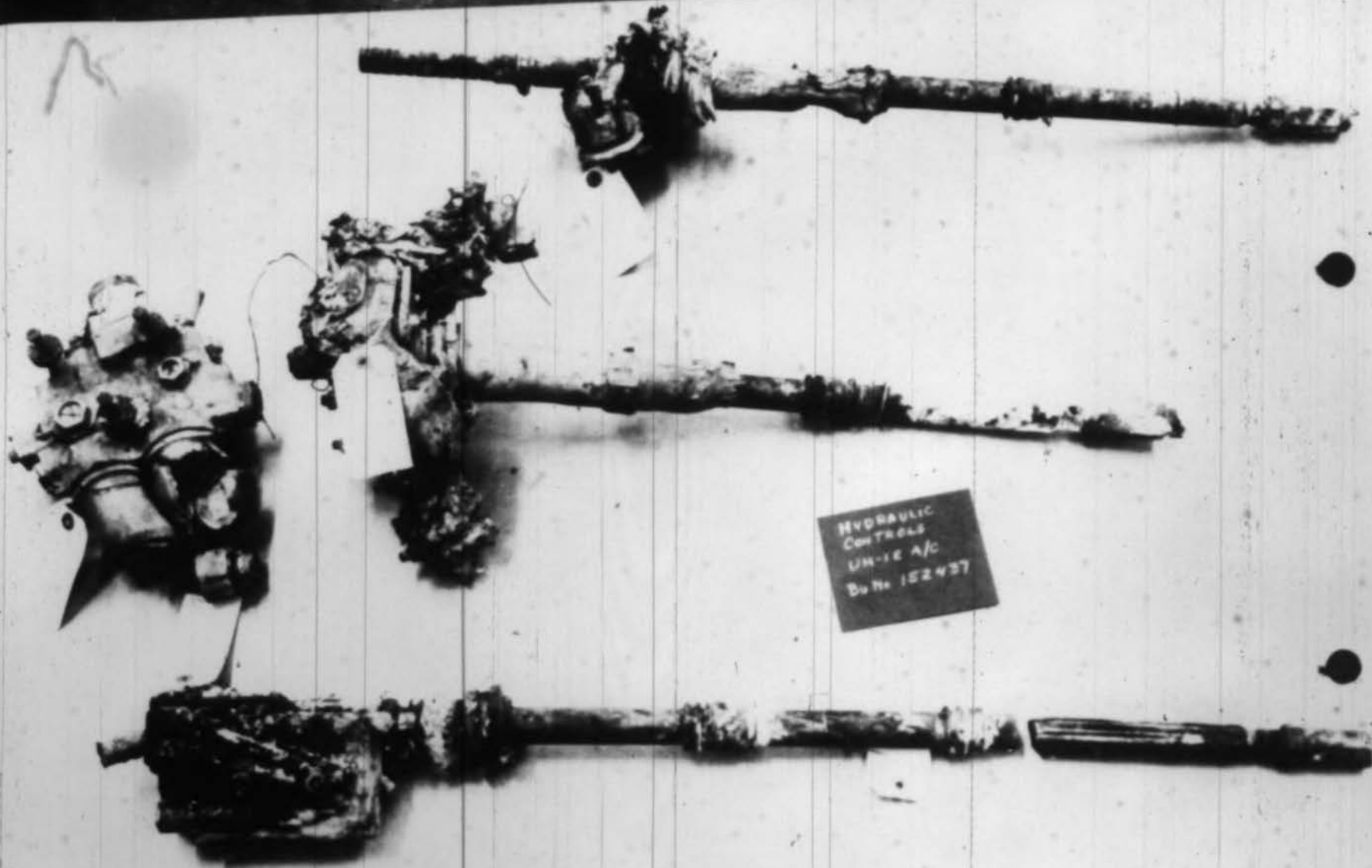
REPORT SYMBOL DUNEPS 8710-2

(b) (6)

**CERTIFIED TRUE COPY**

VMO-5 AAR 1-67A, of 14 APRIL 1967, UH1E BUNO 152437, PILOT GREENLEESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

ENCLOSURE ( )



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.  
VMO-5 AAR-1-67A, 14 April 1967  
UH-1E, BuNo. 152437, Pilot GREENLEESE

ENCLOSURE (1)



# PRIORITY

1. OVERHAUL ACTIVITY <b>ARADMAC</b>		2. REPORT NO. <b>Q-55</b>		3. DATE OF R/T <b>4-27-67</b>		4. ASSEMBLY NOMENCLATURE AND PART NO. <b>Tail Rotor Drive Shaft, 204-040-620-3</b>		5. ENGINE <input type="checkbox"/>	
5. ASSEMBLY (Model) <b>UH-1E</b>		6. ASSEMBLY (Serial) <b>Unk</b>		7. ASSEMBLY MFR <b>Hell</b>		8. DATE REMOVED <b>4-24-67</b>		9. REMOVED FROM (Eng Rod) <b></b>	
10. REMOVED FROM (Eng Ser) <b></b>		11. TOTAL HRS SINCE NEW <b>Unk</b>		12. HRS SINCE LAST O/M <b>Unk</b>		13. DATE LAST O/M <b>Unk</b>		14. LAST OVERHAUL ACTIVITY <b>Unk</b>	
15. NO. PREV O/M'S <b>Unk</b>		16. AIRCRAFT (Model) <b>UH-1E</b>		17. AIRCRAFT (BUNO) <b>152437</b>					
18. OPERATING ACTIVITY <b>WMO-5</b>		19. PUR-OPS - AAR - I/PN/MA <b></b>		20. REASON FOR REMOVAL AND CODE <b>Aircraft Accident</b>		21. DISCREPANT PARTS (Part No.) <b></b>			
22. FINDINGS <input checked="" type="checkbox"/> NO DISCREPANCY		<input type="checkbox"/> BASIC (MFG/DESIGN) DISCREPANCY		<input type="checkbox"/> N (MAINT/OPER) DISCREPANCY		<input type="checkbox"/> FOREIGN OBJECT DAMAGE		23. PRIMARY PART FAILURE (Part No.) <b></b>	
24. DESCRIPTION OF FINDINGS (Include name and part no. of primary part failure)  Examination of the aft portion of the second section of the tail rotor drive shaft revealed that failure was caused by over-stress as a result of tension and bending loads (Incl 1)						25. DISCREPANT PARTS (Part No.) <b></b>			
						26. PERTINENT BULLETINS, CHANGES, ETC., INCORPORATED <b></b>			
27. CONCLUSIONS Damage to the shaft was a result of ground impact forces probably at the time of tail boom separation.						28. DISCREPANT PARTS (Part No.) <b></b>			
29. RECOMMENDATIONS None						30. DISCREPANT PARTS (Part No.) <b></b>			
31. PRIORITY <input checked="" type="checkbox"/> PRIORITY <input type="checkbox"/> DIA		32. REQUESTED BY <b>NAVIAIRSYSCOM/STPC/LA</b>		33. REFERENCE <b>NASCREPPAC No. 12409-67</b>		34. SPEC <b>114</b>		35. APPLICABLE <b>INCORPORATED</b>	
36. SIGNATURE <b>(b) (6)</b>		37. TITLE <b>Equipment Specialist (Aircraft)</b>		38. DATE <b>10 May 67</b>					

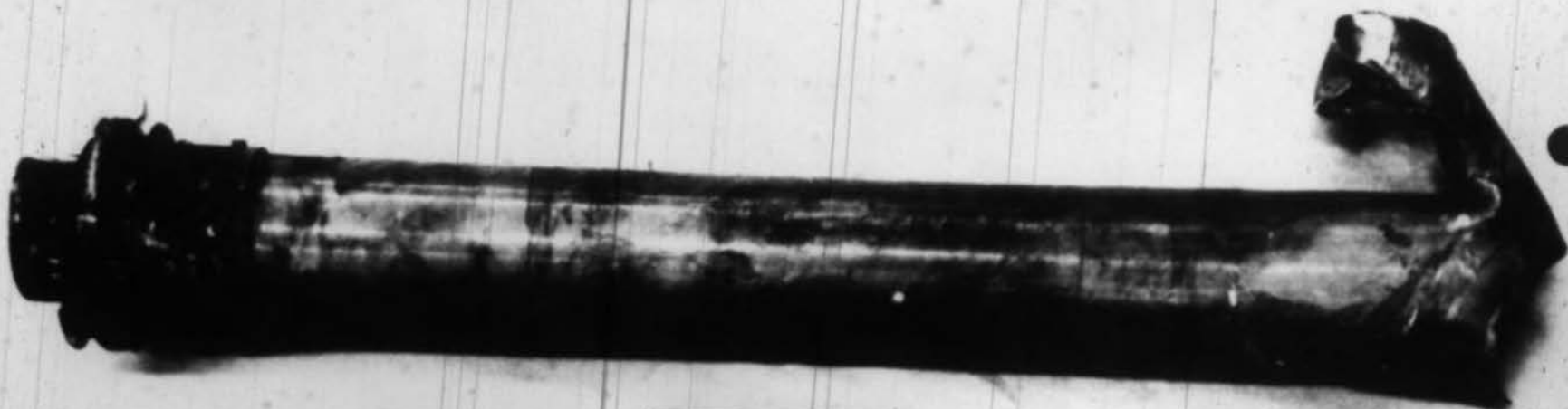
DISASSEMBLY AND INSPECTION REPORT NAVJEPF FORM 4730-2 (11-61)

REPORT SYMBOL BUJEPF 4730-2

**(b) (6)**

**CERTIFIED TRUE COPY**

WMO-5 AAR 1-67A, of 14 APRIL 1967, UH1E BUNO 152437, PILOT GREENLEESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.

VMO-5 AAR-1-67A, 14 April 1967

UH-1E, BuNo. 152437, Pilot GREENLEESE

ENCLOSURE

1. DISCREPANCY ACTIVITY ARADMAC		2. REPORT NO. Q-55		3. DATE OF R/T 11 May 67		4. ASSEMBLY NOMENCLATURE AND PART NO. 42° Gear Box		5. EXISTING <input type="checkbox"/>	
6. ASSEMBLY (Model) UH-1E		7. ASSEMBLY (Serial) B13-4172*		8. ASSEMBLY MFR Bell		9. DATE REMOVED 24-67		10. REMOVED FROM (Bag No.)	
11. TOTAL HRS SINCE NEW Unk		12. HRS SINCE LAST RPT 533		13. DATE LAST RPT Unk		14. LAST DISCREPANCY ACTIVITY Unk		15. NO. PREV RPT'S Unk	
16. OPERATING ACTIVITY VMO-5		17. PWR-EPN-AAR-1/PN/SA		18. REASON FOR REMOVAL AND CODE Aircraft Accident					
19. FINDINGS <input type="checkbox"/> NO DISCREPANCY		<input type="checkbox"/> BASIC (MFG/DESIGN) DISCREPANCY		<input type="checkbox"/> NON-BASIC (MAINT/OPER) DISCREPANCY		<input type="checkbox"/> FOREIGN OBJECT DAMAGE		20. PRIMARY PART FAILURE (Part No.)	
								21. DISCREPANT PARTS (Part No.)	
								22. PERTINENT BULLETINS, CHANGES, ETC., INCORPORATED	
								23. DISCREPANT PARTS (Part No.)	
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								99. DISCREPANT PARTS (Part No.)	
								100. DISCREPANT PARTS (Part No.)	

DISASSEMBLY AND INSPECTION REPORT RAYEFS FORM 4730-2 (11-61) REPORT SYMBOL BUNEP 4730-2

Cu 8 Ag <1 Cr 9 Mg 54 Si 41 Fe 24 Al 6

f. Examination of the drive coupling on the output drive quill revealed indentations made by the female section of the drive coupling when the 90° gear box, mounting bracket, and shaft were separating from the aircraft (Incl 2).

27. Conclusions: No discrepancies were noted other than those caused by impact.

28. Recommendations: None

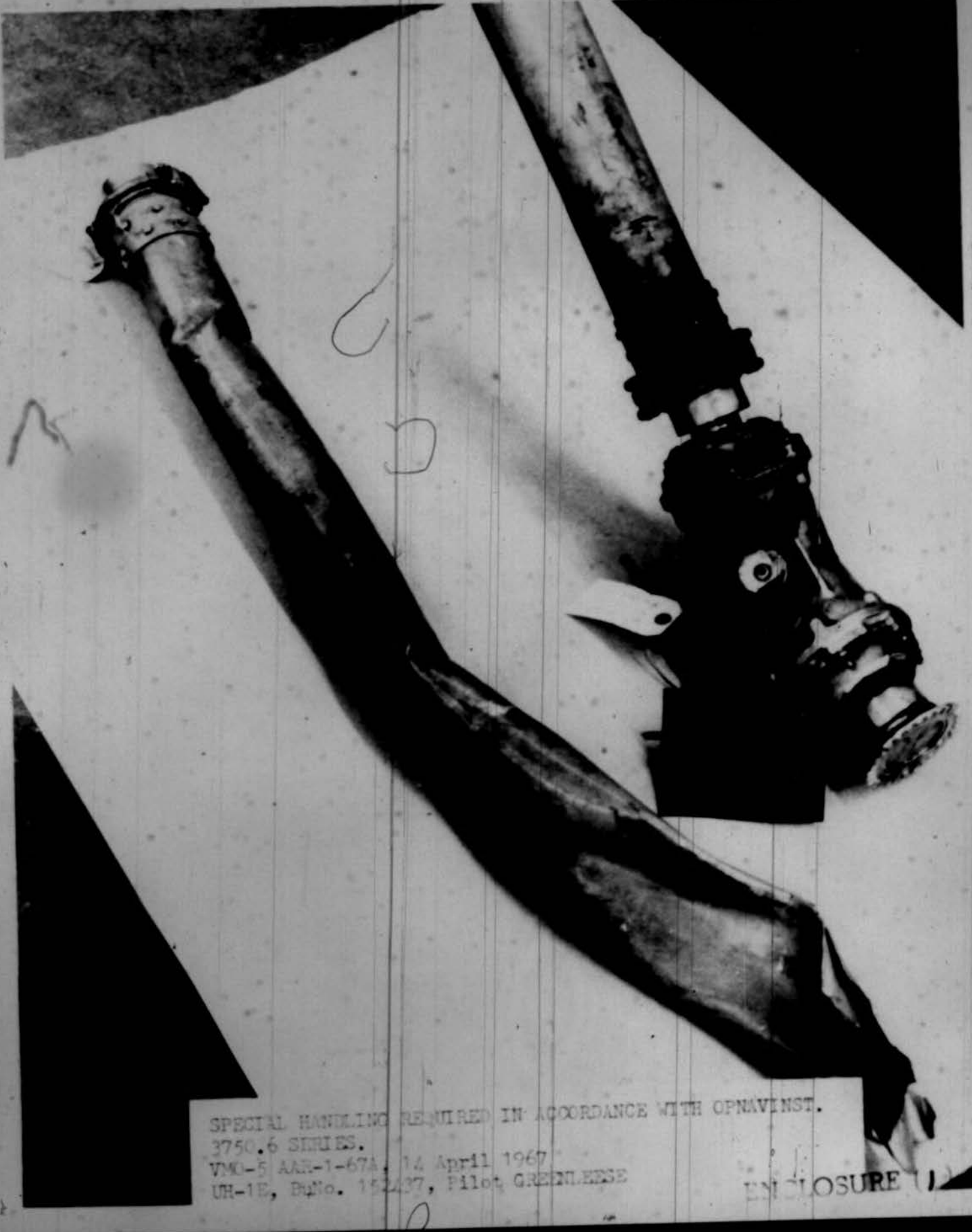
(b) (6)

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VMO-5 AAR 1-67A, of 14 APRIL 1967, UH1E BUNO 152437, PILOT GREENLEESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

ENCLOSURE (14)





SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.  
VMO-5 AAR-1-67A, 14 April 1967  
UH-1E, BuNo. 152437, Pilot GREENLEESE

ENCLOSURE (1)





UH-1E M/C BU No 152437

UPPER END OF DRIVE  
COUPLING ON 42° DRIVE  
GEAR BOX WAS STRUCK  
BY FEMALE SECTION OF  
COUPLING ON THE VERTICAL  
FIN DURING THE  
THE GEAR BOX WAS  
BROKEN AND THE  
60° GEAR WAS

1. ORIGINATING ACTIVITY ARADMAC		2. REPORT NO. Q-55	3. DATE OF RPT 4-24-67	4. ASSEMBLY NOMENCLATURE AND PART NO. 90° Gear Box, 204-040-012-13		5. <input type="checkbox"/>	
6. ASSEMBLY (Model) UH-1E		8. ASSEMBLY (Serial) B13-4866		7. ASSEMBLY WFA Bell	9. DATE REMOVED 4-27-67	10. REMOVED FROM (Eng Ser) Unk	11. REMOVED FROM (Eng Ser) Unk
12. TOTAL HRS SINCE MGR Unk	13. HRS SINCE LAST S/W 593	14. DATE LAST S/W Unk	15. LAST OVERHAUL ACTIVITY Unk		16. NO. HRS SINCE Unk	17. AIRCRAFT (Model) UH-1E	18. AIRCRAFT (Serial) 152437
19. OPERATING ACTIVITY VMO-5		20. FWR - EPR - AAR - L/P/W/GA Unk		21. REASON FOR REMOVAL AND CODE Aircraft Accident			
22. FINDINGS <input checked="" type="checkbox"/> NO DISCREPANCY		<input type="checkbox"/> BASIC (INFO/DESIGN) DISCREPANCY		<input type="checkbox"/> NON-BASIC (MAINT/OPER) DISCREPANCY		<input type="checkbox"/> FOREIGN OBJECT DAMAGE	
23. DESCRIPTION OF FINDINGS (Include name and part no. of primary part failure)		24. PRIMARY PART FAILURE (Part No.)		25. DISCREPANT PARTS (Part No.)		26. PERTINENT BULLETINS, CHANGES, ETC., INCORPORATED	
a. Teardown of the 90° gear box revealed deposits of grease MIL-G-25537, from the crosshead assembly inside the output shaft and inside of the box.							
b. There was no evidence of reverse loading or indication of engine compressor stall on the coast side of the input pinion gear or output bevel gear (Incl 1).							
c. Runout on the output shaft at the slider spline measured 0.058". This condition indicates a heavy strike by one of the tail rotor blades.							
d. The 90° gear box with the mounting bracket, P/N 204-030-828-1, attached separated when the rivets sheared in the vertical fin structure. The direction of failure was up, out, and forward (Incl 2).							
27. PRIORITY <input checked="" type="checkbox"/> DIS		28. REQUESTED BY NAVAIRSYSCOMREPPNCLIA		29. REFERENCE NASCREPPAC 2400-67		30. DATE 11 May 67	
31. TITLE (b) (6)		32. TITLE Equipment Specialist (Aircraft)		33. DATE 11 May 67			

# DISASSEMBLY AND INSPECTION REPORT NAVVEPS FORM 4730/2 (11-61)

REPORT SYMBOL BUVEPS 4730-2

e. The threads on the 90° gear box output shaft failed in shear when the static stop pounded the tail rotor yoke (Incl 3).

f. The splined coupling on the 90° gear box input pinion drive quill bottomed out when the gear box and mounting bracket separated from the vertical fin (Incl 4).

f. Spectrographic analysis of the oil sample revealed the following:

Cu	Ag	Cr	Mg	Si	Fe	Al
16	<1	8	23	16	120	60

The iron concentration in the 90° gear box is higher than is normally found; however, on occasion iron has been observed at higher concentrations with no resulting discrepancies.

27. Conclusions: Damaged parts were a result of ground impact forces.

28. Recommendations: None

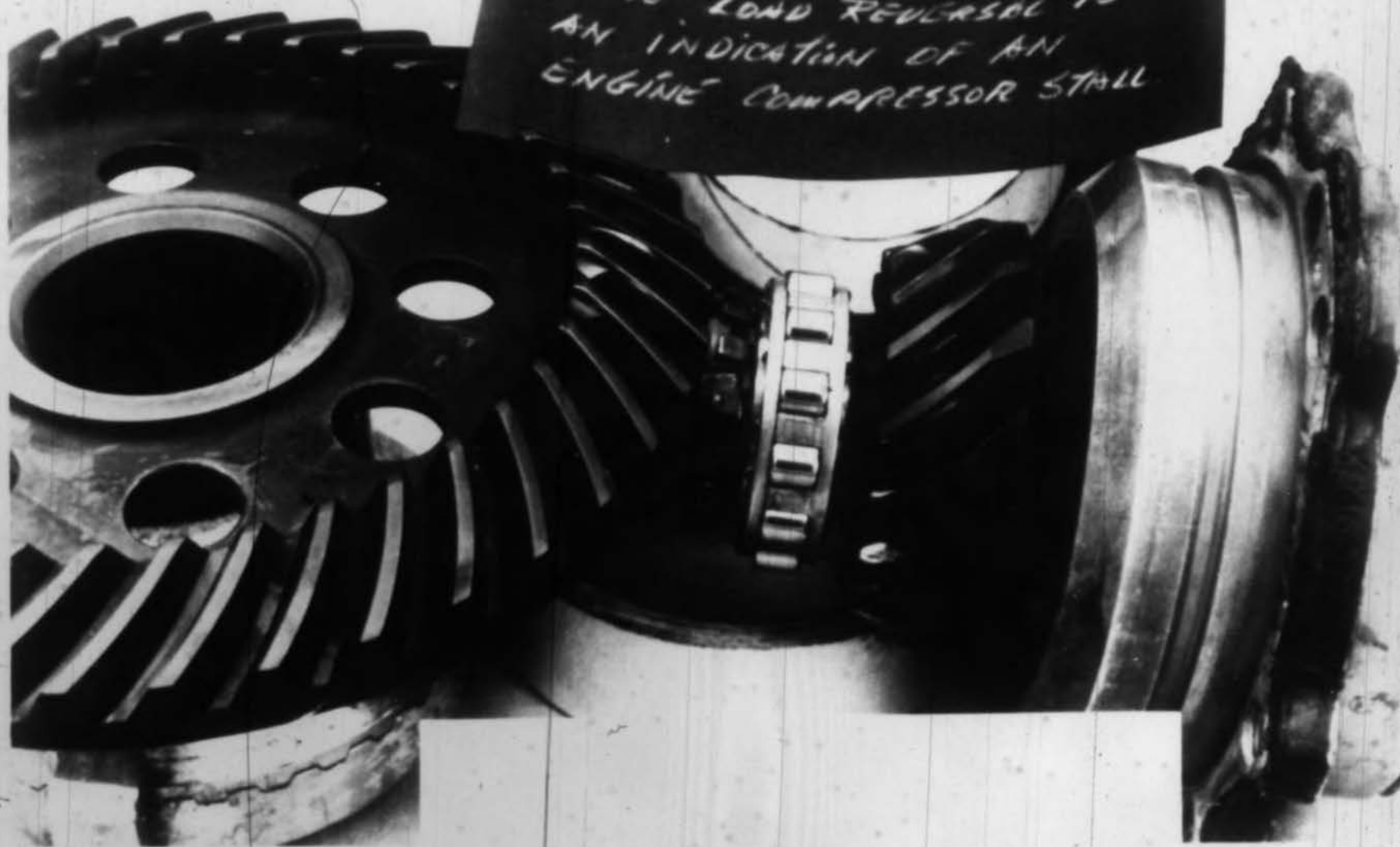
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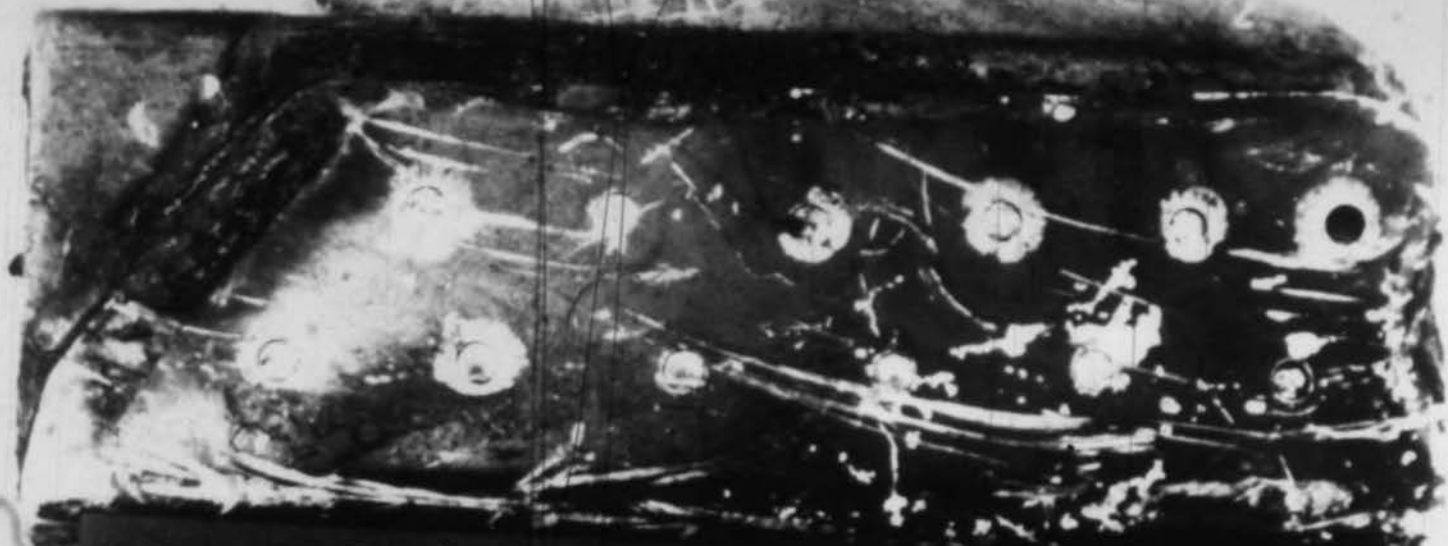
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VMO-5 AAR 1-67A, of 14 APRIL 1967, UH1E BUNG 152437, PILOT GREENLEESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

ENCLOSURE (17)

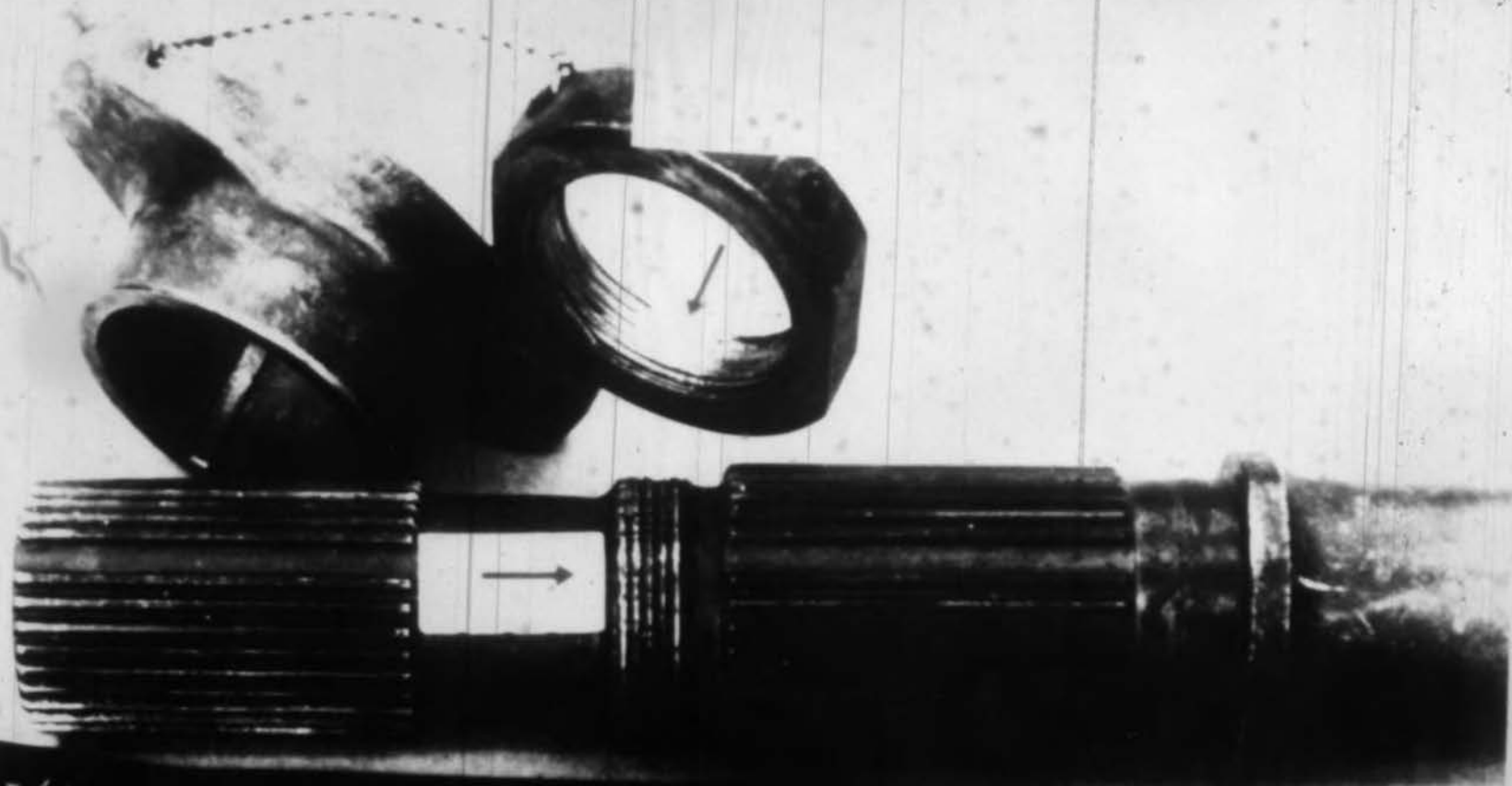
UN-18 A/C BU NO 152437  
NO EVIDENCE OF REVERSE  
LOADING NOTED ON THE  
CONST SIDE OF THE GEARS  
FROM THE 90° GEAR BOX  
NOTE LOAD REVERSAL IS  
AN INDICATION OF AN  
ENGINE COMPRESSOR STALL





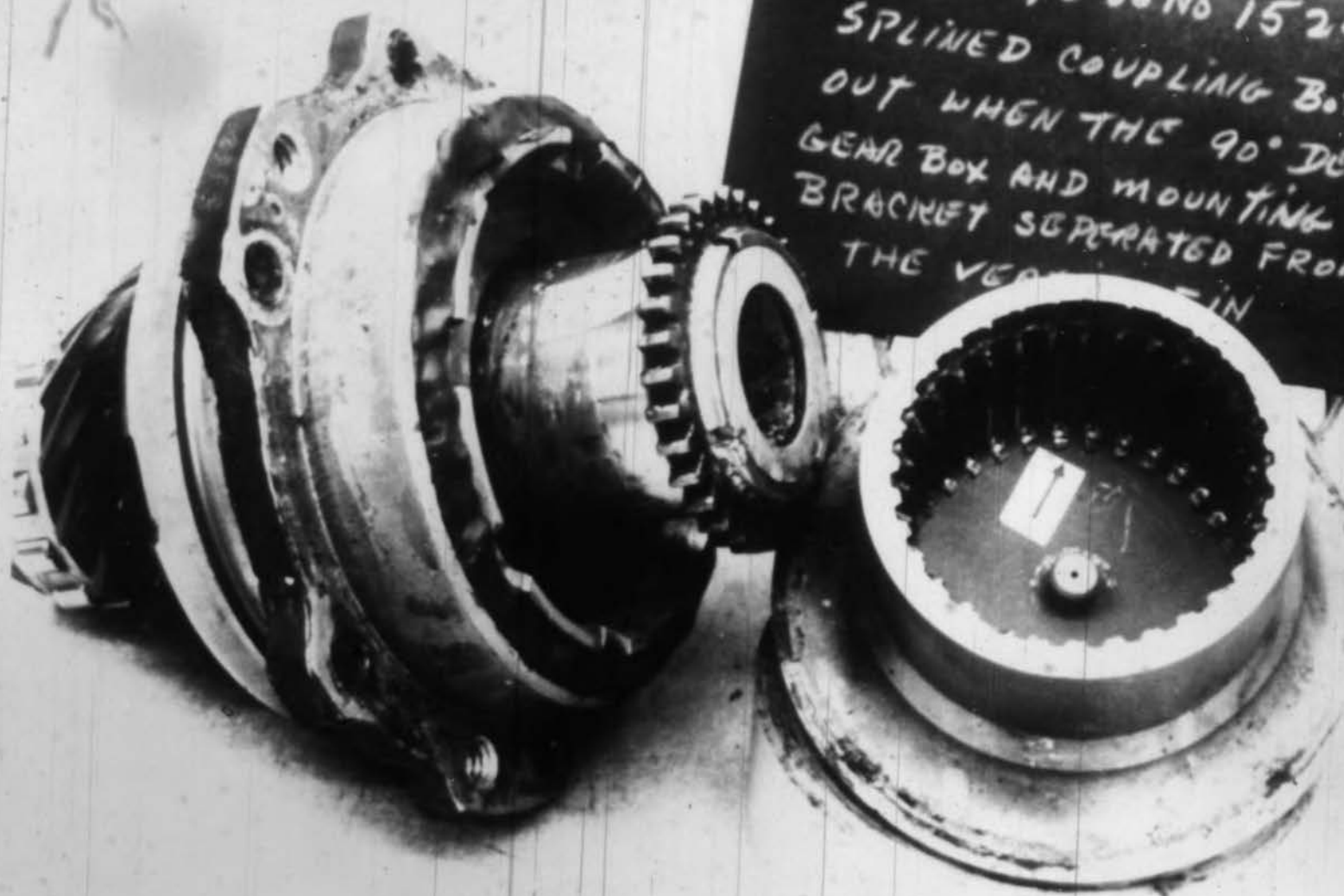
UH-1E A/C BU No 152437  
RIVETS IN THE 90°  
DEGREE GEAR BOX MOUNTING  
BRACKET SHEARED  
UP, OUT AND FORWARD





UH-1C 152437

THREDS ON THE 90° DEGREE  
GEAR BOX OUTPUT SHAFT AND  
TAIL ROTOR HUB NUT WERE  
STRIPPED BY THE STATIC  
STOP POUNDING ON THE  
TAIL ROTOR YONE



UH-1E A/C BU No 152437  
SPLINED COUPLING BOTTOMED  
OUT WHEN THE 90° DEGREE  
GEAR BOX AND MOUNTING  
BRACKET SEPARATED FROM  
THE VER... IN

PRIORITY

1. OPERATING ACTIVITY WMO-5		2. REPORT NO. 4730-2		3. DATE OF RPT. 11-1-67		4. ASSEMBLY NUMBER AND PART NO. 204-011-701-13		5. ENGINE <input type="checkbox"/>	
6. ASSEMBLY (Model) WMO-5		7. ASSEMBLY (Serial) 204-011-701-13		8. ASSEMBLY WPN 204-011-701-13		9. DATE STOWED 11-1-67		10. REMOVED FROM (Eng Mod) 204-011-701-13	
11. TOTAL HRS SINCE REM WMO-5		12. HRS SINCE LAST D/W WMO-5		13. DATE LAST D/W WMO-5		14. LAST OVERHAUL ACTIVITY WMO-5		15. NO. PREL WMO-5	
16. OPERATING ACTIVITY WMO-5		17. FUR-DEN. AAR. LOT/WM WMO-5		18. REASON FOR REMOVAL AND CODE WMO-5		19. AIRCRAFT (Model) WMO-5		20. AIRCRAFT (Serial) WMO-5	
21. FINDINGS <input type="checkbox"/> NO DISCREPANCY <input type="checkbox"/> BASIC (W/D/DESIGN) DISCREPANCY <input type="checkbox"/> NON-BASIC (W/D/DESIGN) DISCREPANCY <input type="checkbox"/> FOREIGN OBJECT DAMAGE		22. PRIMARY PART FAILURE (Part No.) WMO-5		23. DISCREPANT PARTS (Part No.) WMO-5		24. PERTINENT BULLETINS, CHANGES, ETC. (INCORPORATED) WMO-5		25. DATE 11-1-67	
26. DESCRIPTION OF FINDINGS (Include name and part no. of primary part failure) <p>a. Examination of the red blade assembly when removed revealed that the bolt, P/N 204-011-701-13, was the pilot's link to the white blade grip, P/N 204-011-701-13, and failed from overstress (Incls 1 &amp; 3).</p> <p>b. The major portion of the white blade appeared open to the vertical fin and drive shaft and was not damaged by fire. The white blade was the first blade to strike the fin (Incl 4). Examination of the white blade revealed marks on the white paint catch with the drive needs in the tail rotor control chain (Incl 2).</p> <p>c. Microscopic examination of the tail rotor white revealed that failure was a result of bending warpage caused by impact from the tail rotor out into the vertical fin (Incl 5).</p>									
27. PRIORITY D/R		28. REQUESTED BY NAVAIRSCC/STW/PC/OLN		29. REFERENCE NAVAIRSCC 4730-2		30. APPLICABLE INCORPORATED		31. DATE 11-1-67	
32. SIGNATURE (b) (6)		33. TITLE Lieutenant Colonel (Aircraft)		34. DATE 11-1-67		35. DATE 11-1-67		36. DATE 11-1-67	

DISASSEMBLY AND INSPECTION REPORT NAVJEPs FORM 4730/2 (11-61)

REPORT SYMBOL BUWEPs 4730-2

d. The red blade was excessively damaged by fire and a middle section approximately 12" long was missing (Incl 6). Microscopic examination of the red blade leading edge revealed that this blade had also struck the vertical fin. Marks on the leading edge of the blade match with the damage on the drive shaft approximately 120" from the damage left by the white blade.

e. Removal of the bolts from the blades and blade grips revealed that shear force on the red blade bolts was opposite to the white blade bolts (Incl 5).

f. Examination of the hub assembly, P/N 204-011-701-13, revealed that the yoke had pried against the static clip, P/N 204-011-701-13 (Incl 7), causing the hub nut, P/N 204-011-701-13, to strip in the threaded area.

g. One bolt was missing from the crosshead, P/N 204-011-711-1, and silver, P/N 204-011-720-3 (Incls 7 & 8). Examination of the underside of the crosshead revealed that the washer under the head of the bolt had sheared the crosshead several times (Incl 9). Microscopic examination of the bolt hole in the crosshead revealed that

(b) (6)

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WMO-5 AAR 1-67A, of 14 APRIL 1967, UH1E BUNG 152437, PILOT GREENLEES  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

ENCLOSURE (18)

PRIORITY

Q-55, UH-1E, S/N 152437

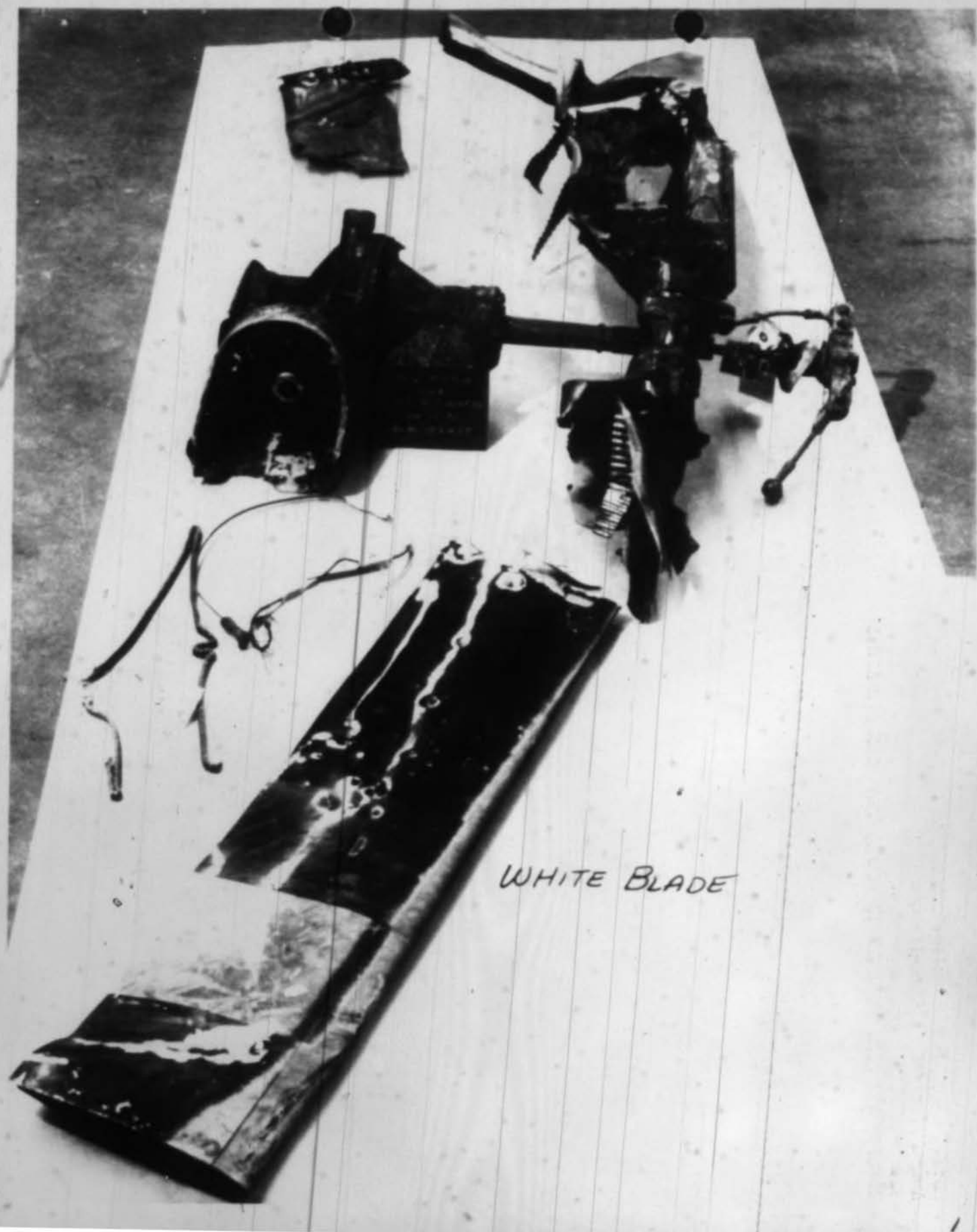
impressions of threads from the bolt had been worn into the inboard side of the bolt hole (Incl 10). Thread mark impressions were also noted in the bolt hole in the flange of the slider (Incl 11).

h. Microscopic and visual examination of the fractured tail rotor control cable strand ends revealed the cable failed because of overstress induced by bending of the cable over an apparently sharp object. The strand ends were found to be necked down and/or sheared at an angle at the fracture surface, typical of overstress failures in aircraft cables. No brittle type fractures were noted that would indicate the cable failed through fatigue mechanisms.

27. Conclusions: That the loss of bolt, P/N AN174-14A, and nut, P/N NAS679-A4, caused loss of the tail rotor control system. A loose slider would cause a high frequency vibration and inability to make normal turns because of improper blade angles.

28. Recommendations: None





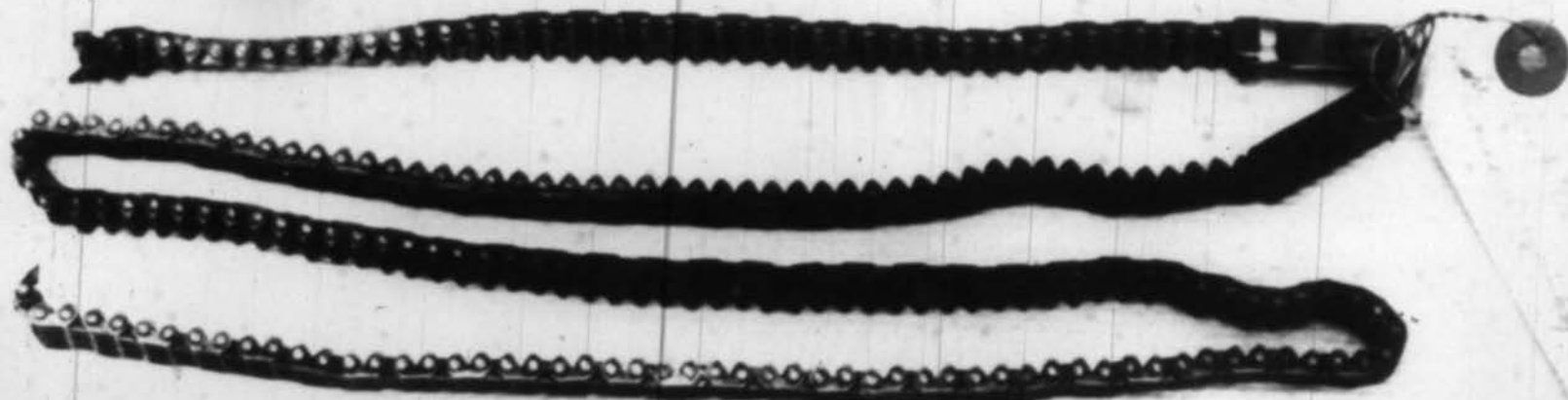
WHITE BLADE



REPAIR HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
10460 SERIES.

74-1-1-67A, 12 April 1967

104-10, P. No. 152477, Pilot GREENLEAF



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.  
VMO-5 AAR-1-67A, 14 April 1967  
UH-1E, BuNo. 152437, Pilot GREENLEESE

RED BLADE

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES  
VMO-5 AAR-1-67A, 14 April 1967  
UH-1E, BuNo. 752437, Pilot GREENLEESE

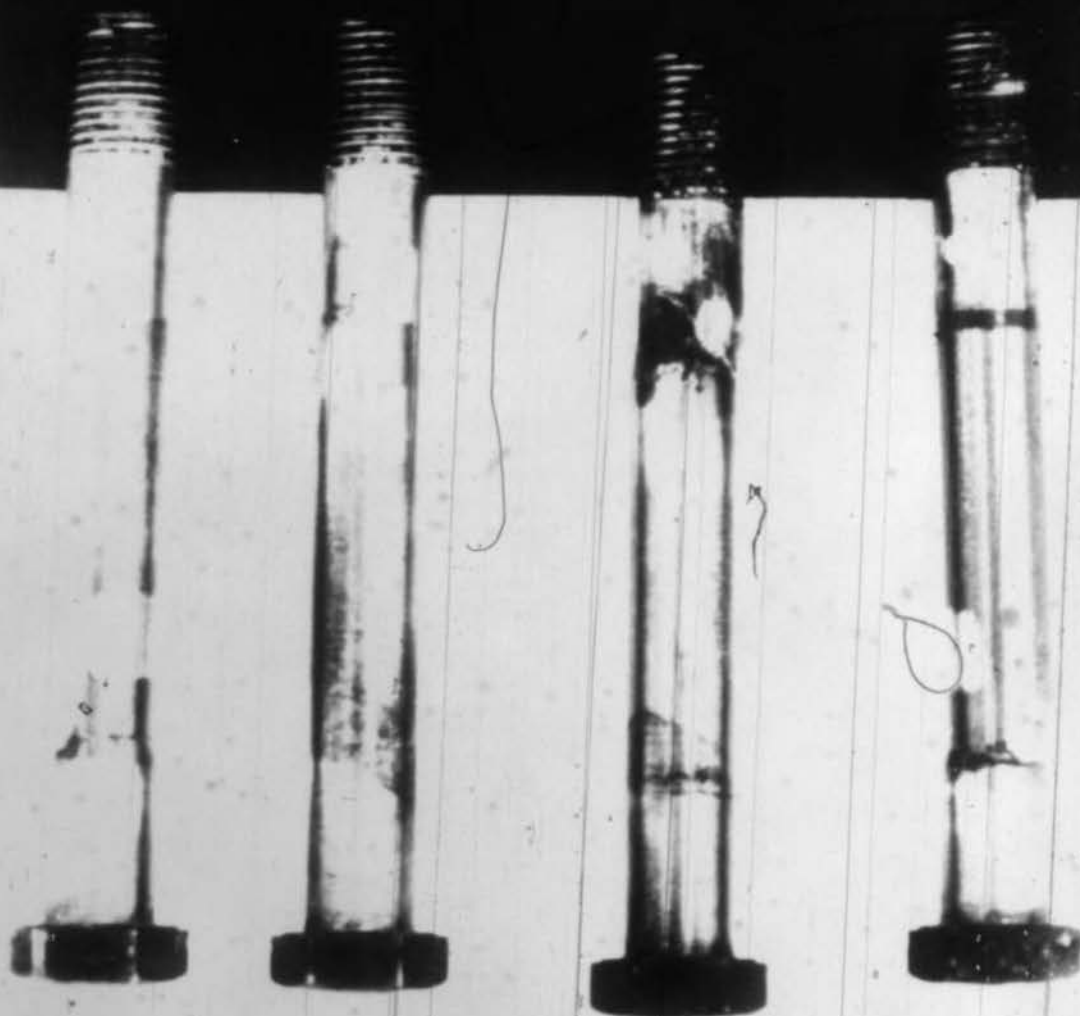


UH-1E A/C BU No 152437

NOTE SHEAR FORCE ON  
RED BLADE BOLTS IS  
OPPOSITE ON WHITE BLADE  
BOLTS.

RED  
LEADING TRAILING  
EDGE EDGE

WHITE  
LEADING TRAILING  
EDGE EDGE





UH-1E A/C Bu No 152437

NOTE STRIKE MARKS  
MADE BY THE TAIL ROTOR  
YOKE ROUNDING ON THE  
STATIC STOP



UH-1E BuNo 152437  
SLIDER RETAINING  
BOLT WAS MISSING  
FROM CROSS HEAD ASSY  
ON TAIL ROTOR CONTROL

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST.  
3750.6 SERIES.

VMO-5 AAR-1-67A, 14 April 1967

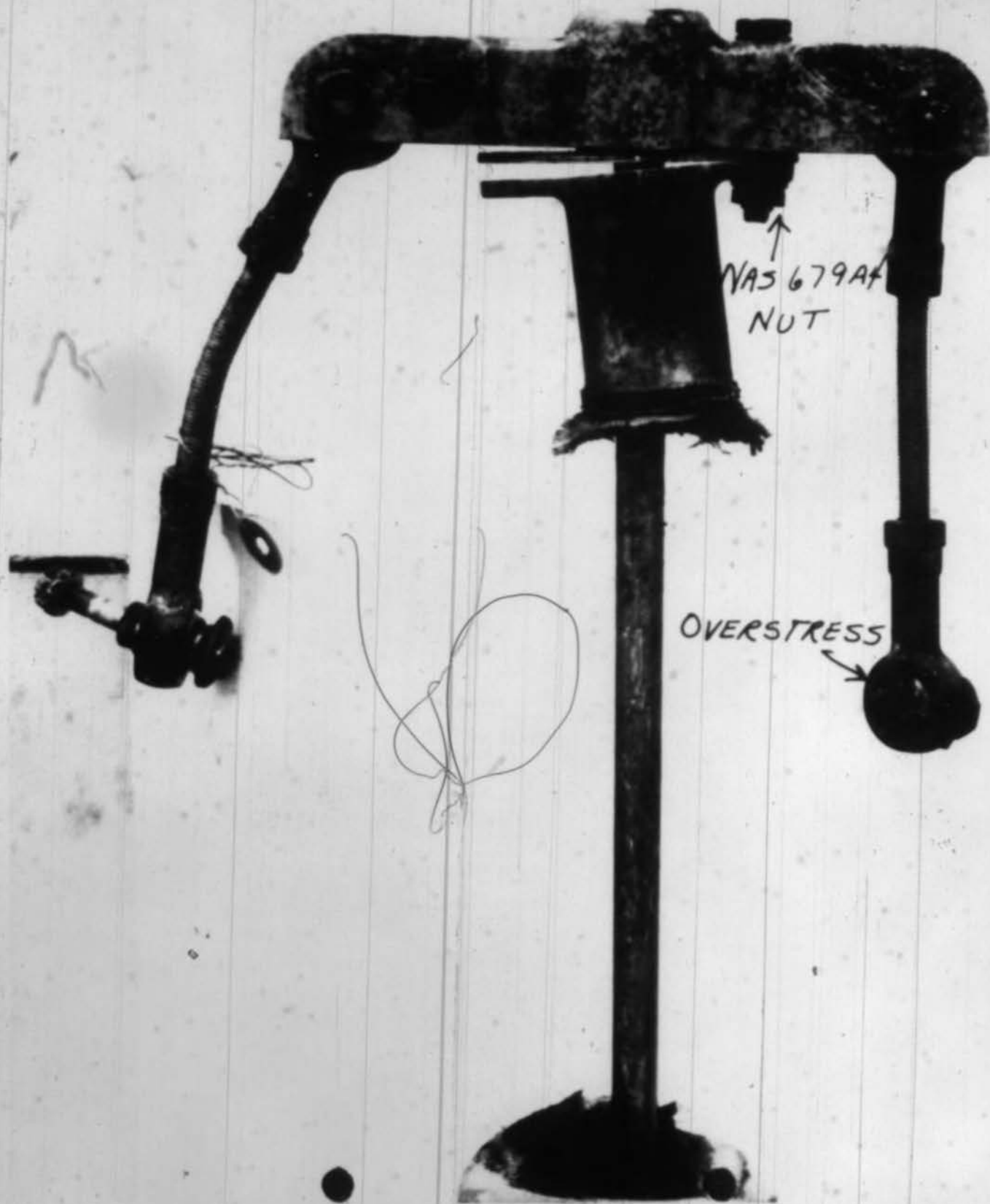
UH-1E, BuNo. 152437, Pilot GREENLEESE

ENCLOSURE

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPERATING.

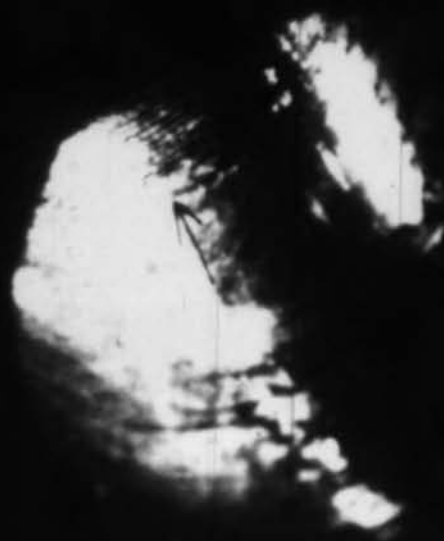
3750.6 SERIES.  
VMO-5 AAR-1-67A, 17 April 1967  
UH-1B, BuNo. 152237, Pilot GREEN, KESSE

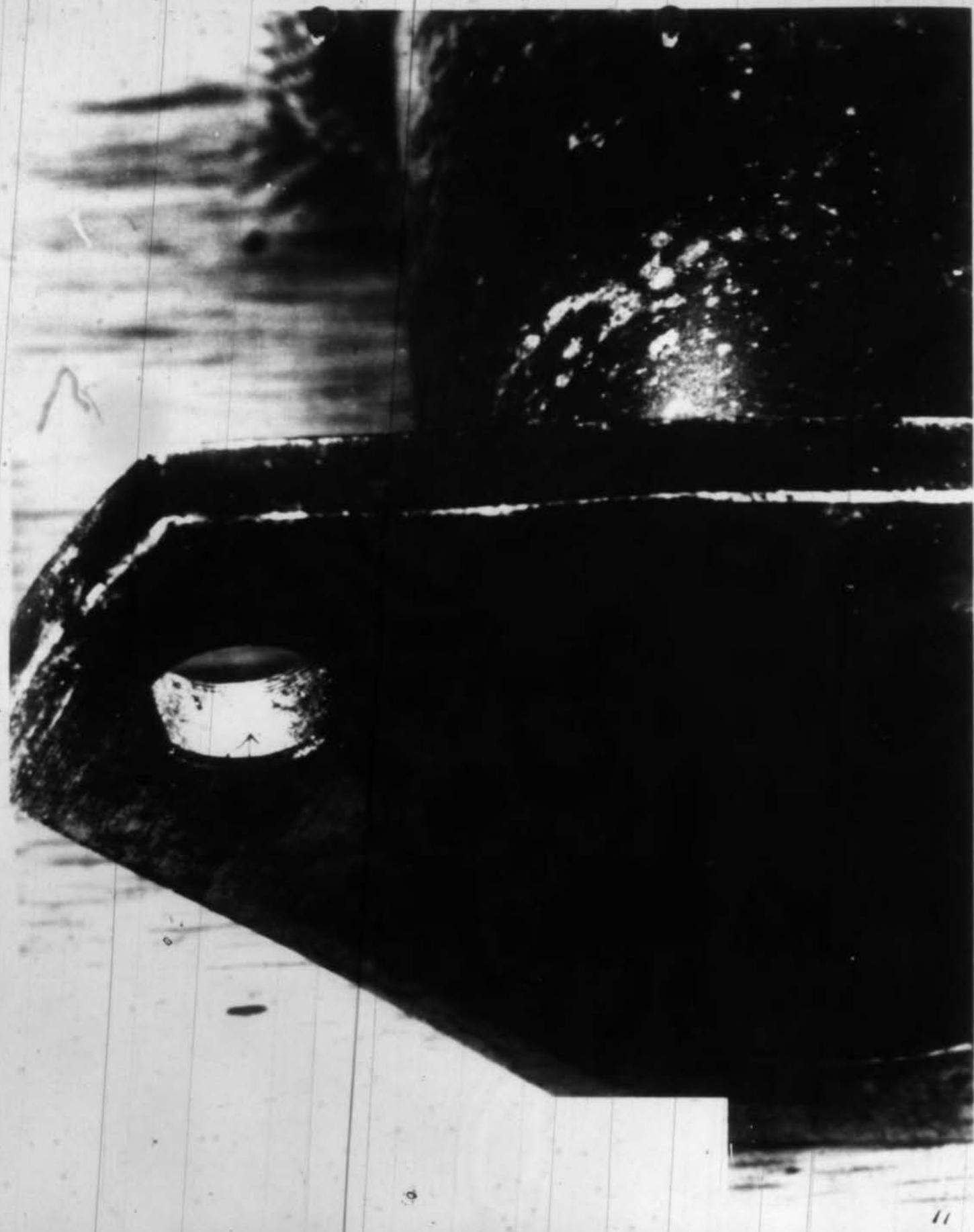
8













**BELL  
HELICOPTER COMPANY**

POST OFFICE BOX 482 • FORT WORTH, TEXAS 76101 A  COMPANY

# TECHNICAL DATA

BY R. E. Eggers DATE May 18, 1967  
R. E. Eggers, UH-1E Project Engineer  
CHECKED \_\_\_\_\_ DATE \_\_\_\_\_  
APPROVED J. A. Buyers DATE May 18, 1967  
J. A. Buyers, UH-1 Project Engineer  
APPROVED \_\_\_\_\_ DATE \_\_\_\_\_

MODEL UH-1E

NO. OF PAGES

REPORT NO. 204-099-869 DATE 5-18-67

TITLE UH-1E ACCIDENT INVESTIGATION  
ASSISTANCE - (Bu No 152437) -  
VMO-5  
CAMP PENDLETON, CALIFORNIA

PREPARED UNDER CONTRACT

(b) (6)

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BY R. E. EggersBELL HELICOPTER COMPANY  
1001 10TH AVE S.E. TACOMA, WASH. 98402MODEL UH-1E PAGE 2

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RPT. 204-099-869INTRODUCTION

On 3 May 1967, Bell Helicopter Company responded to a request for assistance from Major (b) (6) senior member of Aircraft Accident Report Board, by sending Robert E. Eggers, UH-1E Project Engineer, and Robert Breyer, Metallurgist, to Camp Pendleton, California. The engine and most dynamic components had been sent to ARADMAC for examination. Due to initial negative results on these components, Bell representatives were requested to examine the remaining parts for anything that may have been overlooked in prior investigation.

BY R. E. EggersBELL HELICOPTER COMPANY  
200 NORTH 11TH AVE • DALLAS, TEXAS 75201MODEL UH-1E PAGE 3

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RPT. 204-099-869INVESTIGATION

The remaining parts revealed no fatigue or structural breaks that were the initiating cause of the accident, but several points were observed that may aid in the investigation.

1. The lead cyclic counter balance weights located under the floor beneath the copilot's seat were melted away in the fire, but the bolts were bent forward and approximately 20° right.
2. The 5th mount support is crushed on the right hand side, and the lower right segment of the engine is broken away. The right mounting hole in the 5th mount support is elongated to the rear. This indicates the engine moved forward and to the right on impact and struck the 5th mount support.
3. The white blade shows indications of having struck the ground twice. The first time it struck only the outboard three feet contacted the ground, as evidenced by (1) the chordwise scratches on the underside of the blade, and (2) the spar is bent up just inboard of the tip weights. The second contact of the white blade was a solid leading edge strike which compressed the blade skin to the rear. It should be noted that the chordwise scratch marks caused by the first strike are continuous through crumpled compressed portion of the blade.
4. Radios in the nose compartment also indicate impact at about 20° right of the nose.
5. The tail boom failed in compression on the left side and the tension on the right side at approximately Station 250.
6. One bolt was missing on the crossbar of the tail rotor. Major (b) (6) questioned Bell on the results to be expected from loss of this bolt in the air. Bell Helicopter Company conducted tests as detailed in Appendix B to acquire supporting data to answer this question. As noted in the detailed test report, the exact environment of the helicopter cannot be duplicated, and therefore the results of the test are not

BY R. E. Eggers

BELL HELICOPTER COMPANY

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MODEL UH-1E PAGE 4

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RPT. 204-099-869INVESTIGATION (cont)

6. (cont)

necessarily conclusive. However, the magnitude of the loads applied to cause the pitch change link to fail is so far above normal loads that it is assumed the damage must have occurred on impact.

Bell Helicopter Company also sent Mr. Don Swartwout, Metallurgist, to ARADMAC to examine components at that location. Details of this examination are reported in Appendix A.



BY R. E. Eggers

BELL HELICOPTER COMPANY  
4001 AIRCRAFT ROAD  
FORT WORTH, TEXAS

MODEL UH-1E PAGE       

RPT 204-099-869

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APPENDIX A

METALLURGICAL REPORT

OBSERVATIONS MADE ON UH-1E HELICOPTER  
COMPONENTS SENT TO ARADMAC FROM CAMP  
PENDLETON, CALIFORNIA



BELL HELICOPTER COMPANY  
Engineering Laboratories

Report No. 20467M-132  
May 11, 1967  
Page 1 of 12

To: UH-1 Project

Copies to: Messrs. W. Diehl, G. Galerstein, W. Humphrey,  
N. Mackenzie/W. Rollings/ECF, M. J.  
McGuigan, R. Pascher, E. Roseler; Lab.  
Files (3) AVCOM Office, Bell Plant

Subject: OBSERVATIONS MADE ON UH-1E HELICOPTER COMPONENTS  
SENT TO ARADMAC FROM CAMP PENDLETON, CALIFORNIA

HISTORY AND RELATED DATA

Helicopter:

Model -----UH-1E (540)  
Registration -----152437

Operation:

Operator -----U. S. Marines  
Base -----Camp Pendleton, California  
Unit -----VMO-5

INTRODUCTION

On April 14, 1967, a UH-1E helicopter crashed on the side of a mountain in California. A number of dynamic components were flown to ARADMAC at Corpus Christi, Texas, for disassembly and examination. The writer was dispatched to ARADMAC to view the parts. Personnel at ARADMAC requested that since they officially were to examine the parts and report their findings, all disassembly was to be performed by them. This report covers only visual observations made on the parts as received at ARADMAC.

CONCLUSIONS

The parts received at ARADMAC were severely fire damaged and contained numerous fractures and items of secondary damage.

All the fractures viewed appeared to be secondary static overload fractures, the result of ground impact. None of the components exhibited gross wear, corrosion, or evidence of malfunction which might have started an accident sequence.

#### DISCUSSION

The components returned were from the following general areas:

1. Main rotor blade roots
2. Main rotor hub assembly
3. Upper mast and controls
4. Lower mast and controls
5. Transmission parts
6. Engine to transmission driveshaft
7. Servo cylinders
8. Tail rotor system

Each area was visually examined and any area of interest or any area requiring laboratory analysis was brought to the attention of ARADMAC personnel.

1. Main Rotor Blade Roots, Figure 1

Both main rotor blades had some fire damage. The white blade had been sawed off at a convenient length and the red blade had fractured near the end of the doublers. Both blades had fractured axially through the honeycomb trailing edge from an overload on the drag braces. All fractures were the result of gross overloading during ground impact.

2. Main Rotor Hub Assembly, Figures 1 and 2

The white blade yoke flex plate was bent upward approximately 10°. No other damage was apparent except for burning of the dust covers.

3. Upper Mast and Controls, Figure 2

Stabilizer Bar:

Both stabilizer bar outer tubes had fractured statically from bending toward the white rotor blade. Three of the four stabilizer bar support mounting bolts fractured statically from the shear. The shear force appears to have resulted from a flapping overtravel by the main rotor yoke which contacted the lower end of the stabilizer bar support and pushed upward.

Flapping Restraint:

The roll pins fastening the dynamic flap restraint blocks to the flapping restraint shaft were both fractured.

Dampers:

The sight glass had been melted from one damper. The other damper appeared still functional and in time. Each of the two damper links had statically fractured from bending and overtravel of the yoke and stabilizer bar on ground contact.

4. Lower Mast and Controls, Figure 3

Mast and Bearing:

The mast had been cut in two to facilitate shipping. There was no discernible bend in the mast. Except for fire damage, the mast bearing appeared in good condition.

Control Tubes:

The pitch control tubes were statically fractured near the mixing levers. The tube sections had been burned off at the scissors and were not available for examination.

Scissors Assembly:

The six bolts securing the drive flange to the scissors hub were sheared from a static overload.

Swashplate:

A static fracture separated the mono-ball pivot from the swashplate support base. Two fractures on the swashplate elevator horn freed a section of the horn. These fractures appeared to be static in nature, but laboratory cleaning is necessary to positively confirm this.

Other Items:

The collective system, anti-drive link, and scissors all appeared free of significant damage.



5. Transmission Parts

Input Quill, Figure 4:

The transmission input quill and the 204-040-269-3 alignment bearing and housing were undamaged by the fire. Six rollers were missing from the bearing, which had separated from the main transmission case in an aft direction after shearing the three retaining pins.

Four 204-040-700 gear teeth had major chips removed from the toes of the teeth. A section 3/8 by 3/8 by 1-1/4 inches had fractured from the alignment bearing journal. Both the journal and the tooth damage appeared to have resulted from the fragmentation of the main transmission case on impact. There was no matching damage on the 204-040-701 mating gear member; however, heavy gouges on the lower bearing journal of the 204-040-324 shaft suggest it may have contacted the input pinion gear.

The main triplex bearing appeared clean and free of damage.

Other Parts:

The transmission case was largely consumed by fire. All the other quills were grossly fire damaged, but appeared free of fractures or other damage not associated with the fire.

6. Engine to Transmission Driveshaft, Figure 5

The driveshaft tube connecting the two spherical couplings fractured statically. The loading appeared to be a bending load which locked up the spherical coupling and restrained the subsequent axial load from the engine as the engine moved forward.

7. Servo Cylinders:

Destroyed by fire.

8. Tail Rotor System

Drive Train, Figure 6:

Both the 42° and the 90° tail rotor gear boxes were relatively undamaged and free of evidence of malfunction. The 90° gear



box support casting had separated from the tail fin by shearing the rivets. Final separation appeared to be in a direction forward and approximately 30° above the horizontal axis of the helicopter.

The fractures on the tail drive shaft were all static fractures with some evidence of impact crippling present.

Control System:

Mechanical twisting plus two fracture locations indicate that the tail rotor pitch control chain fractured after the 90° gear box separated from the tail fin. During the fracturing, the chain was pulled through the sprocket, unscrewing the pitch change rod from the pitch control quill. Except for the mechanical screw separation, no evidence of malfunction existed.

Cross Head, Figure 7:

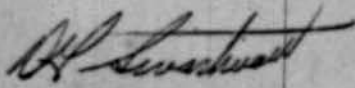
One of the two bolts which secure the slider to the cross head was missing. Because of dirt and fire damage, simple visual examination could not determine if the bolt had fractured on impact or had come out earlier. The ears on the cross head were bent in a shallow "S" shape.

Blades:

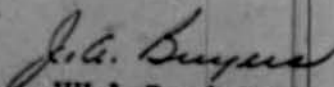
Both tail rotor blades had fractured statically in bending, apparently from ground impact.

Hub Retention:

Abnormal flapping of the tail rotor imposed a bending moment to the static stop, causing the hub retention nut to shear its threads. This likely occurred midway during the crash sequence.

  
D. G. Swartwout  
Metallurgical Engineer  
Metallurgical Laboratory  
Ext. 4571

APPROVED:

  
UH-1 Project

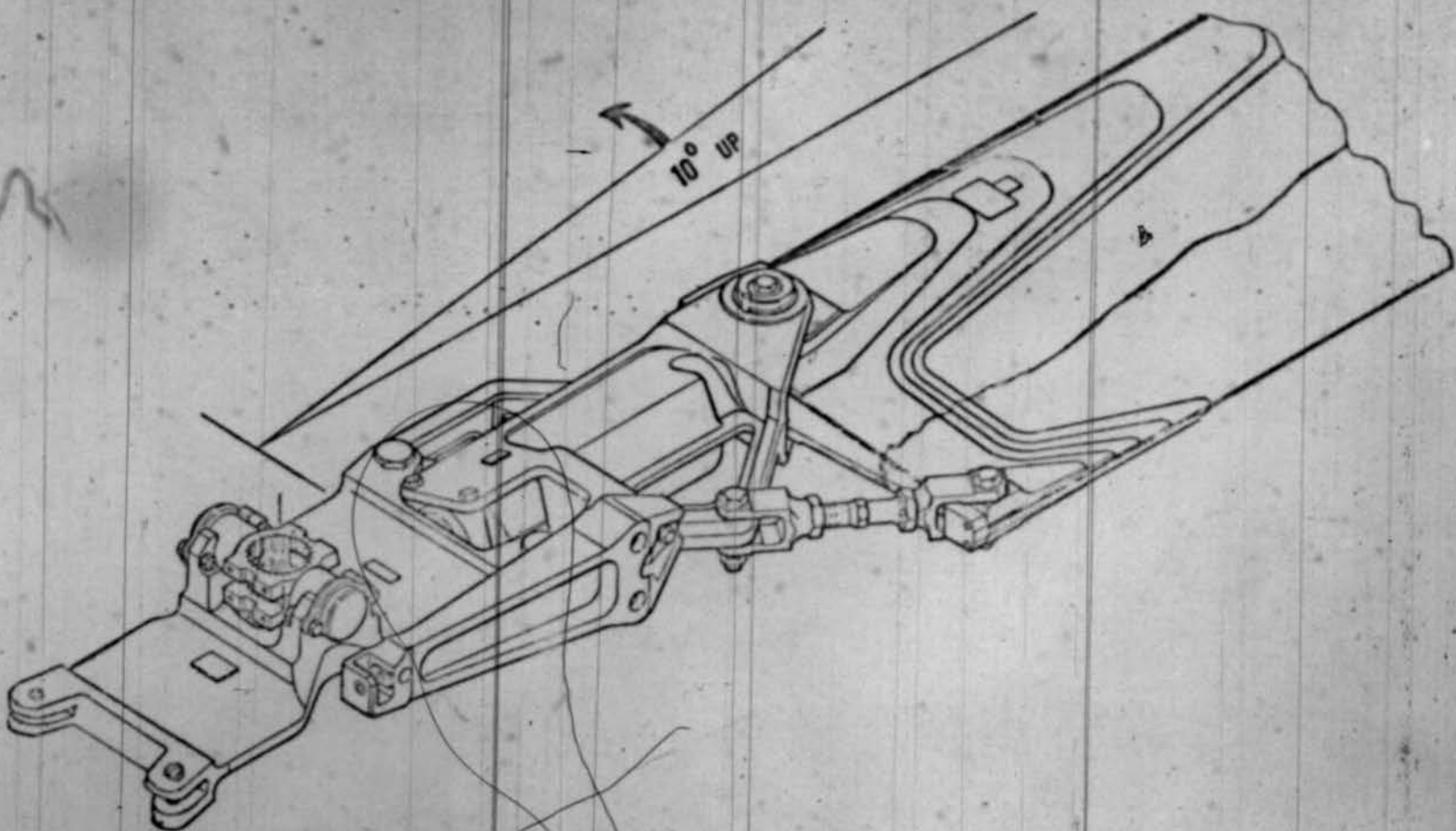


FIG. 1

LOCATION OF FRACTURE IN THE WHITE MAIN ROTOR BLADE  
AND THE BEND IN THE YOKE

VMO-5 AAR 1-67A of 14 APRIL 1967, UH1E HUNO 152437, PILOT GREENLESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

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 "SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

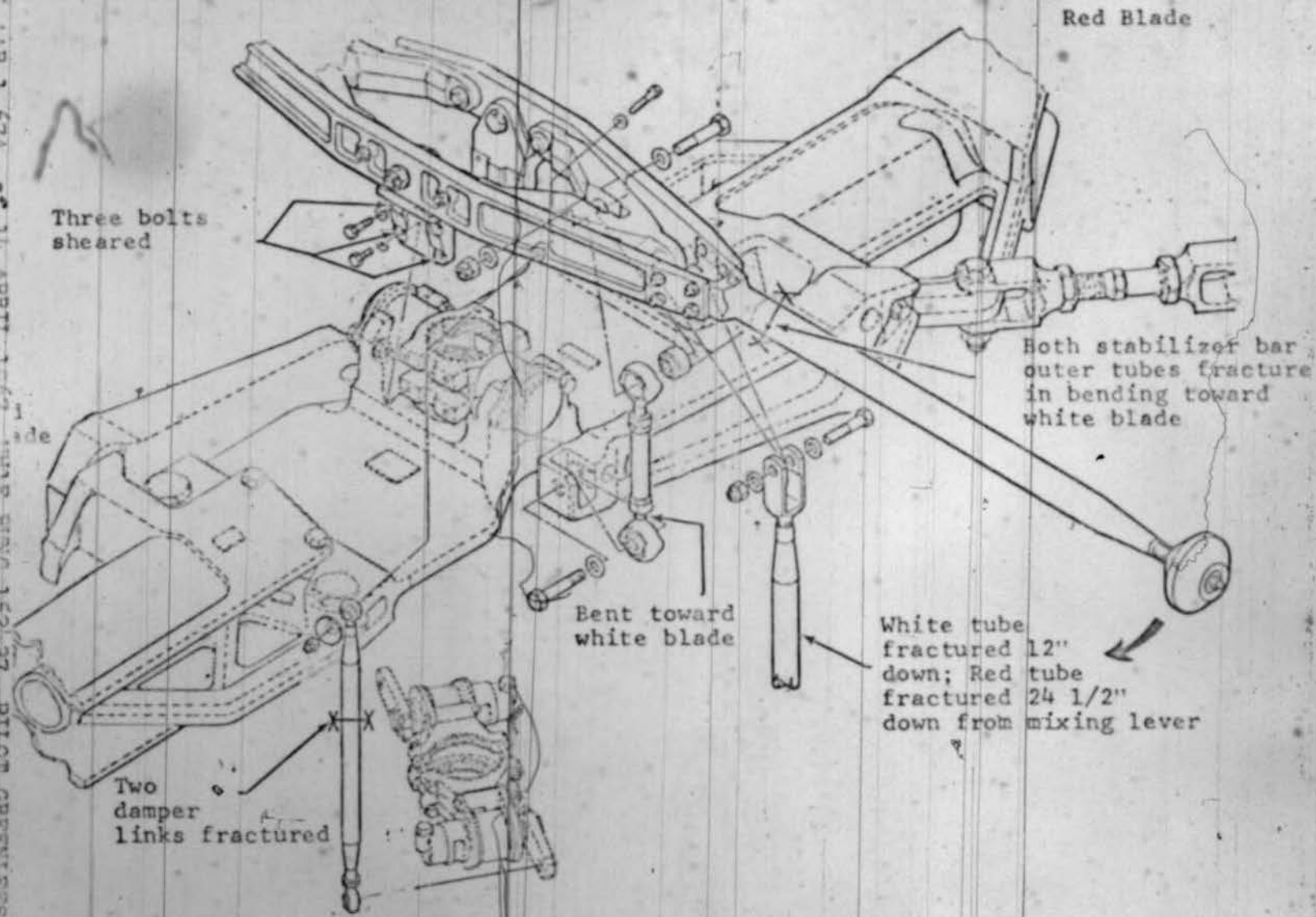


FIG. 2

MAIN ROTOR HUB ASSEMBLY AND CONTROLS

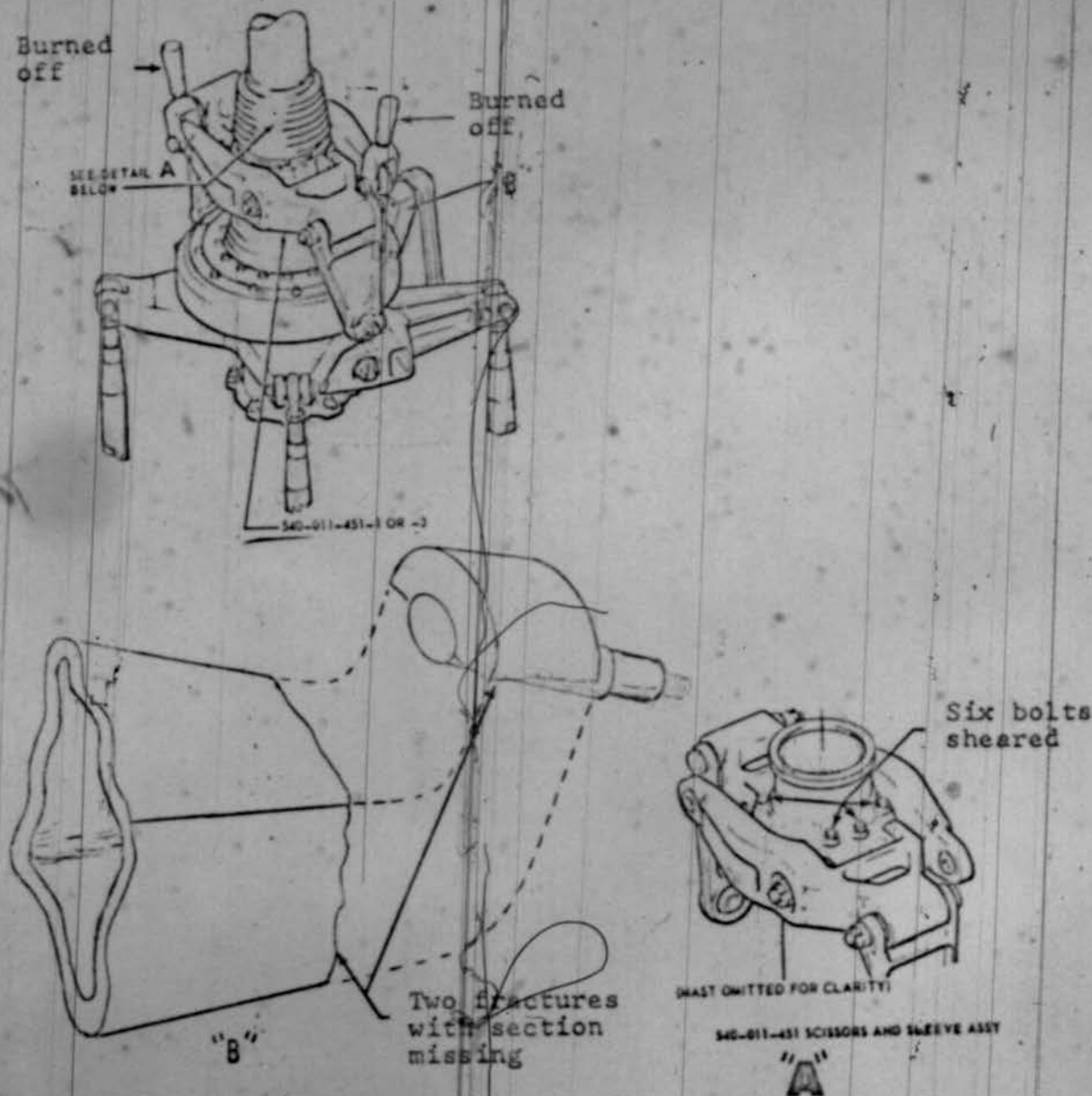


FIG. 3

SCISSORS AND SMASHPLATE FRACTURES



A fracture removing a  
 $3/8 \times 3/8 \times 1-1/4$ " section

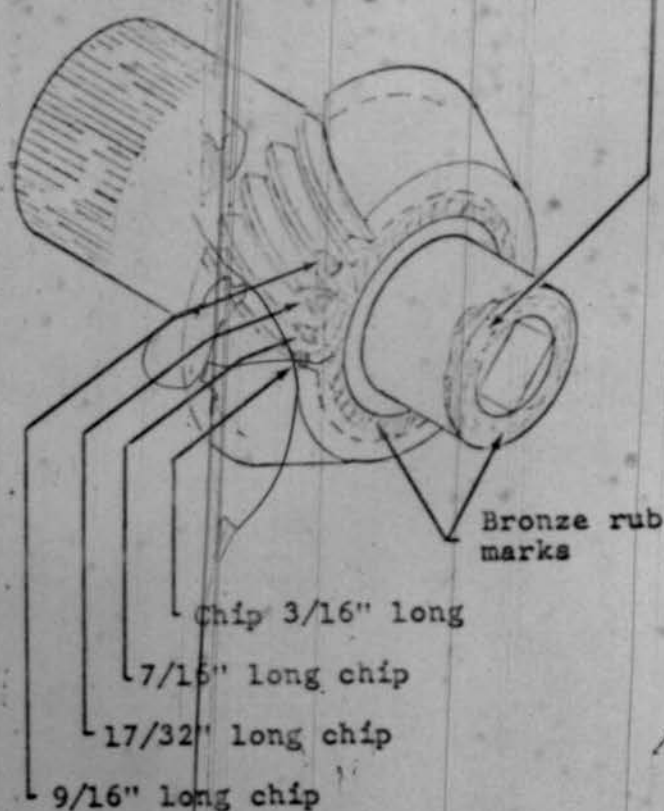


FIG. 4

204-040-700 PINION DAMAGE

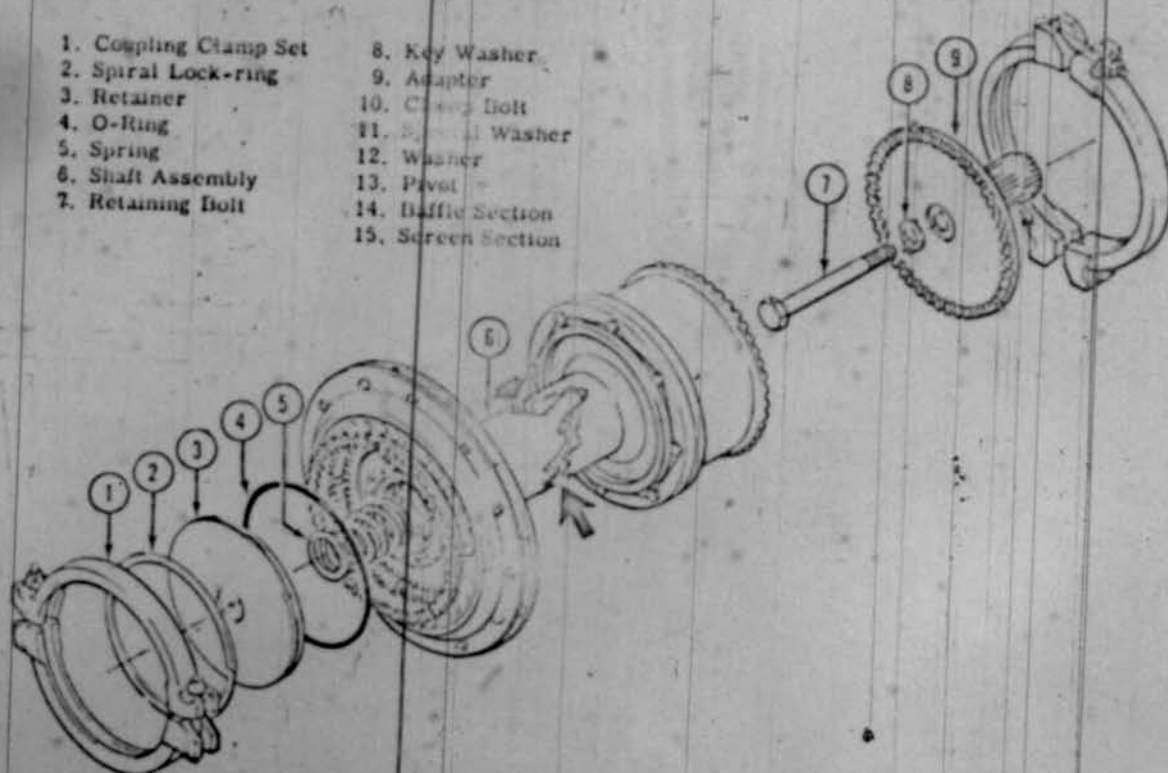


FIG. 5

FRACTURE LOCATION ON THE ENGINE  
TO TRANSMISSION DRIVESHAFT

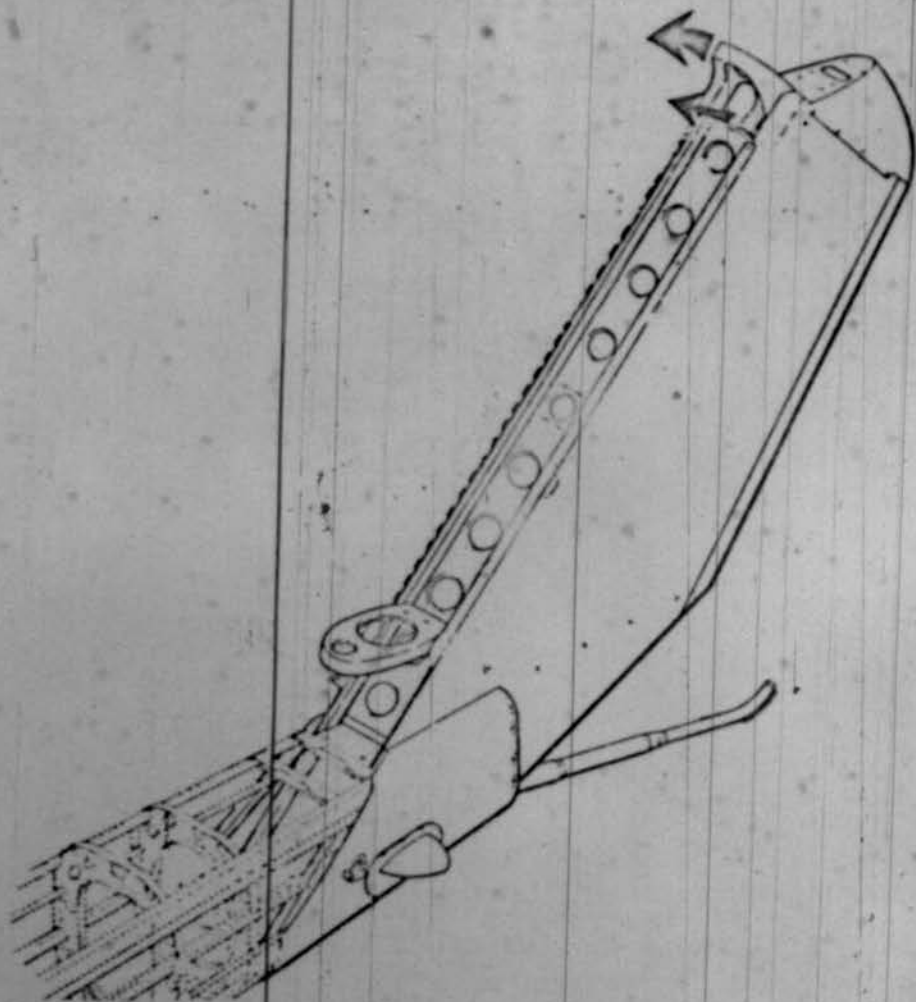


FIG. 6

DIRECTION THE 90° GEAR BOX SUPPORT CASTING  
SEPARATED FROM THE TAIL FIN

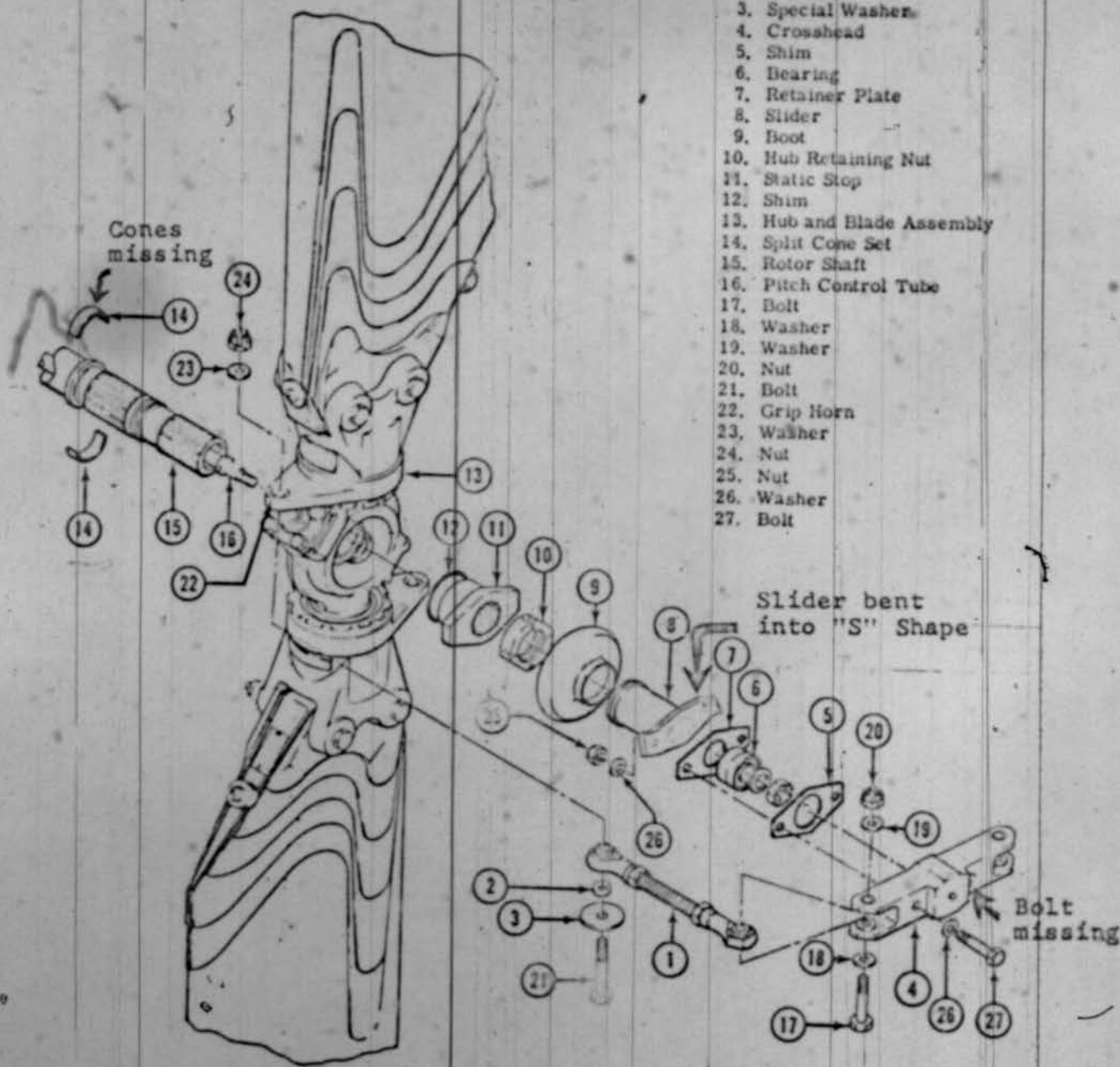


FIG. 7

TAIL ROTOR HUB AND CONTROLS



BY R. E. Eggers

BELL HELICOPTER  
TEST CENTER 204-099-869

MODEL UH-1E PAGE \_\_\_\_\_

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RPT 204-099-869

APPENDIX B

REPORT OF ROTOR SLIDER

AND

CROSSHEAD TESTS

BELL HELICOPTER COMPANY  
Engineering Laboratories

Report No. 20467M-113  
May 18, 1967  
Page 1

To: Mr. R. E. Eggers

Copies to: Messrs. J. Buyers, M. Kawa, J. McGuigan, N. Mackenzie;  
Lab Files, ECF

Subject: REPORT OF 204 TAIL ROTOR SLIDER AND CROSSHEAD TESTS

INTRODUCTION

In an effort to determine whether the loss of one of the two tail rotor slider to crosshead bolts could precipitate loss of the tail rotor, three separate tests were conducted. With one bolt missing, a static load-deflection test was performed to determine whether flight measured loads would produce deflections of sufficient magnitude to impair the operation of the tail rotor. A whirl test was conducted with one bolt loosened and then missing under various conditions of pitch, track, and rpm in an effort to excite a dynamic instability. Finally, a crosshead-slider assembly was loaded statically with all bolts installed and properly torqued to determine what component would fail first and at what pitch link load magnitude the failure would occur.

RESULTS

A. Static Proof Loading

A crosshead-slider assembly was loaded statically by rigidly connecting the two grips and loading the pitch change tube to load the pitch links in compression. The bolt fastening the crosshead and slider on the "red" side was removed, and the pitch links were loaded to -317 lbs. in the "red" link and -348 lbs. in the "white" link. A gap of .031 inches was opened in the slider-crosshead joint on the side with the bolt missing. The gap closed completely after the load was released.

The pitch change tube was then held fixed while a shear load was applied to the steel "yoke" connecting the two grips. This load was applied in line with the flapping axis (so as to produce no flapping) and produced tension in the "white" pitch link and compression in the "red" pitch link. Because of different rigidities (due to the red side bolt missing), the maximum pitch link loads obtained were -182 lbs. in the red pitch link and 496 lbs. in the white pitch link. Under this load a .106 inch gap was opened in the slider-crosshead joint on the red side. No yield or permanent set was evident after the load was released.

### B. Whirl Testing

The same rotor and slider-crosshead used for the static test was whirl tested on the whirlstand. The rotor was tracked and balanced and base line runs were made with all bolts in and properly torqued. Rotor rpm was swept from 0 to 1600 at a constant  $\pm 13^\circ$  pitch and blade pitch was swept from  $-3^\circ$  to  $+13^\circ$  at a constant 1510 rpm. Both pitch link axial loads and blade beam and chord bending moments at stations 11.0, 16.25, and 21.50 were recorded with the instrumentation installed. As usual on the whirl stand, relatively small oscillatory loads were measured. Maximum pitch link oscillatories recorded were  $\pm 25$  lbs.

The nut of the red side crosshead to slider attachment bolt was then backed off 0.09 inches. Several runs were made at 1600 rpm and pitch settings from  $-3^\circ$  to  $+13^\circ$ . Loads measured were the same as for the base line runs. The rotor was then run out of track by adjusting the pitch links so that there was  $1\frac{1}{2}$  turns difference in their relative lengths from the "in-track" lengths. The rotor was whirled at 1540 rpm with  $+13^\circ$  mean pitch and 1600 rpm with  $+8^\circ$  mean pitch. Pitch link oscillatory loads remained below  $\pm 33$  lbs., and no unstable conditions were noted.

The loosened bolt was retorqued and the rotor was again run out of track at 1600 rpm and  $+8^\circ$  mean pitch. Pitch link loads were the same as with the bolt loosened. The rotor was then whirled with the bolt completely removed and no change in results was noted.

A mechanical shaker was then installed on the whirl stand and the frequency of its input force was swept from 0 to 3000 cpm. No pitch link oscillatory loads higher than  $\pm 50$  lbs. could be obtained. The rotor was then whirled at 1600 rpm with the shaker shaking the stand at 1600 cpm. The red crosshead-slider bolt was removed and the pitch was swept from  $-3^\circ$  to  $+13^\circ$  with rotor and shaker rpm at 1600. No pitch link loads higher than  $\pm 40$  lbs. were recorded and no unstable condition could be excited. This was repeated with the shaker set at a lower frequency to excite a primary beam mode of the hub assembly and no change in results was noted. The missing bolt was reinstalled and the runs were repeated. Results were the same.

Pitch link loads and blade bending moments were recorded on permanent records for all whirl test runs.

C. Static Testing

A tail rotor gearbox and pitch change control quill, control tube, slider, crosshead, and both pitch links were assembled per Bell Drawing 204-011-700. The hub and blade assembly was not installed. The gearbox was mounted rigidly to a test fixture. The pitch change quill was locked by means of the control chain and the inboard ends of the pitch links were connected to two levers which maintained the geometrical relationship of the pitch links on the helicopter. Fig. 1 shows a schematic drawing of the test installation.

Both pitch links were loaded simultaneously in compression by calibrated hydraulic cylinders acting through the levers. The magnitude of the applied pitch link load on one side was twice that of the other side. This loading condition was arbitrarily chosen to represent a possible loading due to the hub and blade assembly flapping and coming off of the tail rotor mast on impact in a crash.

At pitch link loads of 1250 pounds compression in one pitch link and 2470 pounds compression in the other, the higher loaded pitch link buckled and fractured at the thread runout on the outboard end. All other components of the test assembly were reacting the applied test loads at the time of the failure, and no evidence of failure or permanent deformation of any other component was found.

By:

*R. L. Filler*  
R. L. Filler  
Test Engineer  
Mechanical Lab

Checked:

*R. L. Lambert*  
R. L. Lambert  
Test Engineer  
Mechanical Lab

Approved:

*G. L. Rodriguez*  
G. L. Rodriguez  
Group Engineer  
Mechanical Lab



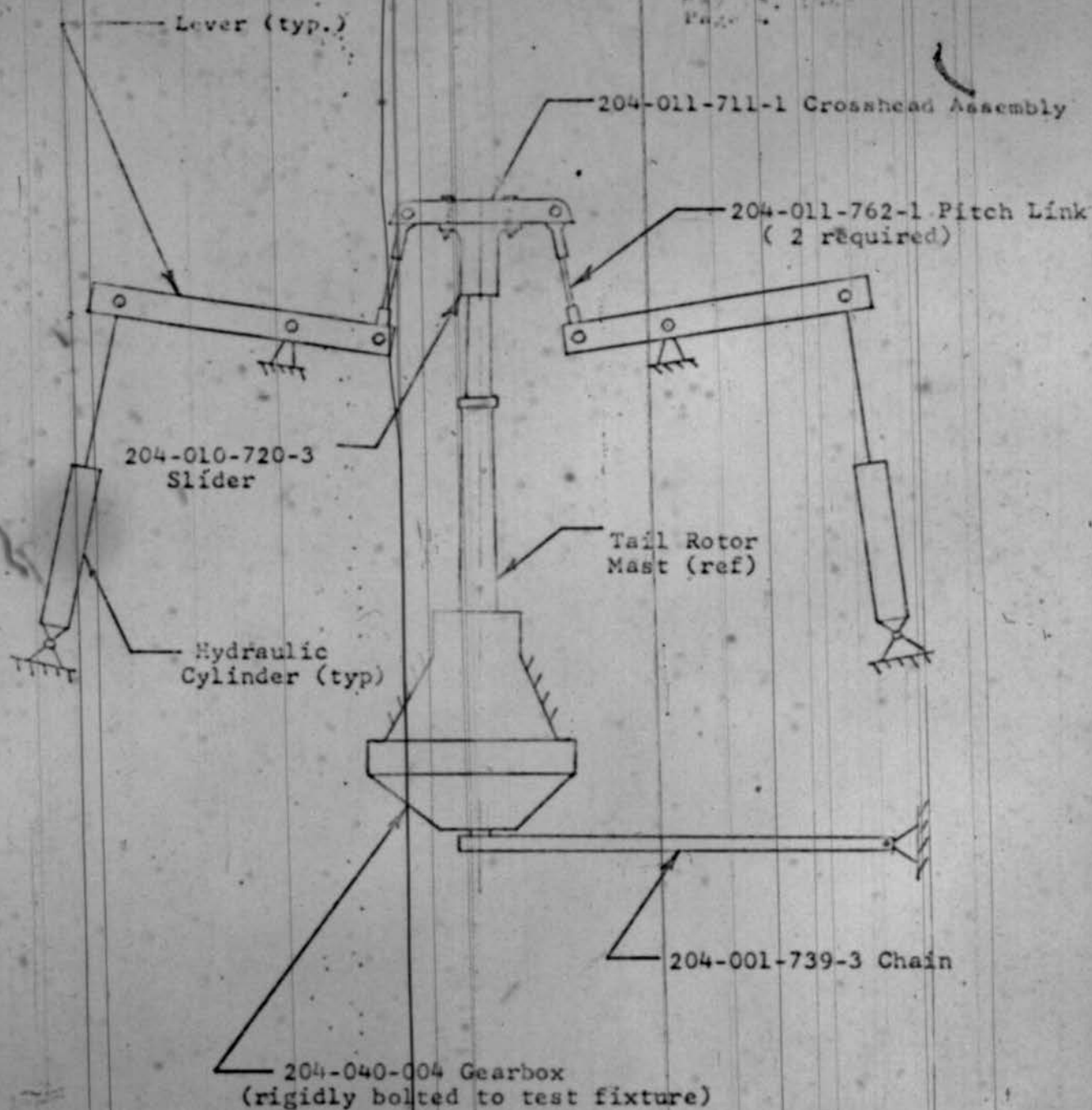
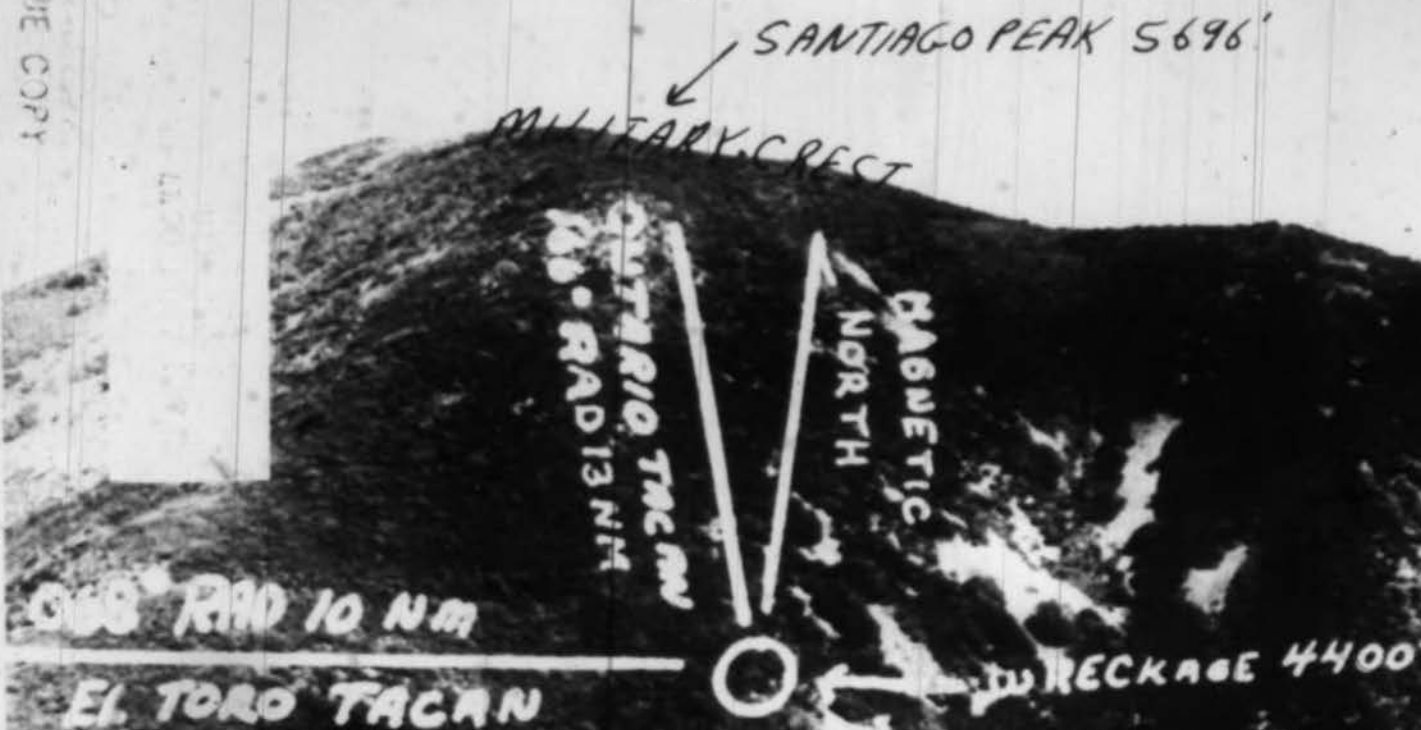


FIG. 1

SCHEMATIC DRAWING OF TEST SET-UP FOR STATIC FAILURE TEST OF  
204 TAIL ROTOR CROSSHEAD-SLIDER



SPECIAL HANDLING REQUIRED IN ACCORDANCE  
W.T. ORIGINATOR 3760.6 SERIES  
VAL-1 AAR-1-67A, 14 April 1967  
UN-12, BuNo. 152437, Pilot Greenhouse





HEADQUARTERS  
MARINE OBSERVATION SQUADRON 5  
MHTG-30, 3dMAW, FMFPac  
MCALP, Camp Pendleton, California 92055

FLIGHT SCHEDULE

DATE: 14 APRIL 1967 FRIDAY

SUNRISE: 0522

OOD: LT. (b) (6)

ODO: CAPT. (b) (6)

DUTY SECTION: 3

SUNSET: 1819

TOTAL HRS THIS MONTH=304.8

ODO: CAPT. OVERFIELD

EVT	BRIEF	T/O	LAND	PILOT	CO-PILOT	C/C MISSION/WT
1	0645	0730	0900	*PLUM	C/C	1 FAM
2	"	"	"	*GREENLEESE	FUNCHEON	1 PQM X/1500
3	"	"	"	(b) (6)		2 TGT ACQ-1/1500
4	"	"	"			1 TAC-1
5	"	"	"			2 INST-5/1200
6	"	"	"			2 INST-5/1200
7	"	"	"			2 TGT ACQ-1/1500
8	0915	1000	1130	*GREENLEESE	FUNCHEON	1 PQM X/1500
9	"	"	"	(b) (6)		1 TAC-1
10	"	"	"			2 INST-5/1200
11	"	"	"			1 EXT WT
12	"	"	"			2 TGT ACQ-1/1500
13	"	"	"	*PLUM	C/C	1 FAM
14	"	"	"	(b) (6)		2 INST-5/1200
15	1145	1230	1400			FAM-8X
16	"	"	"			2 WT-4/1500
17	"	"	"			2 INST-4/1200
18	"	"	"			1 EXT WT
19	"	"	"			2 TGT ACQ-1/1500
20	"	"	"	*GREENLEESE	FUNCHEON	1 PQM X/1500
21	"	"	"	(b) (6)		2 INST-6/1200
22	1415	1500	1630			2 NAV-2
23	"	"	"			2 INST-5/1200
24	"	"	"			2 TGT ACQ-1/1500
25	"	"	"			2 TGT ACQ-2/1500
26	"	"	"			2 INST-5/1200
27	"	"	"			1 FAM-9

ASTERISK (\*) DENOTES PILOT IN COMMAND

TOTAL HOURS SCHEDULED=41.5

NOTE 1: CAPTS DEIBERT AND NEUBIG AND LT (b) (6) WILL ATTEND THE 0815 ELECTRICAL SYSTEMS LECTURE AT THE NAMO BLDG. ANY OTHER INTERESTED PILOTS ARE INVITED TO ATTEND.

NOTE 2: NATOPS PHASE LECTURE AT 1000 IN THE READY ROOM - MAJ UPSHULTE AND LTS (b) (6)

# EVENT 18 TAKE LTCOL (b) (6) AND THREE PERSONNEL TO GREEN BEACH. COORDINATE THEIR RETURN AS REQUIRED.

Q.O.D. (36): THE CARGO DOORS ARE JETTISONABLE. TRUE OR FALSE?

ANSWER TO YESTERDAY'S Q.O.D. (35): FALSE

APPROVED BY:

SUBMITTED BY:

(b) (6)

(b) (6)

CERTIFIED TRUE COPY

VMO-5 AAR 1-67A, of 14 APRIL 1967, UN-18 DENO 152437, PILOT GREENLEESE  
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH CENAV INST 3750.6 SERIES

ENCLOSURE (22)



# RESUME OF PILOTS FLYING EXPERIENCE LAST FIVE FISCAL YEARS

For First Lieutenant William E. GREENLEESE (b) (6) USMC

COMMAND ATTACHED	Period Assigned	Model A/C	Flight Hours	CV LDGS DAY/NIGHT	Operational Proficiency
HMM-263, MAG-26, 2dMAW	Feb 62 -				
	Sept 62	HUS	155.8	35 17	NONE
HMM-262, MAG-26, 2dMAW	Oct 62 -	SNB	3.3		"
	Jan 63	UH34D	130.5	3	"
HMM-261, MAG-16, 1stMAW	Jan 63 -	UH34D	633.9	77 7	"
	May 64	H43	3.7		"
		H19	11.4		"
WFO-6	Jul 64 -	C45J	4.6		"
	Aug 65	H19	3.0		"
		H23	2.0		"
		H43	232.0		"
		UH1E	156.0	1	"
		H52	1.4		"
Sub Unit #1 HMM-462	Aug 65 -	H34	2.1		"
	May 66	UH1E	284.0		"
Sub Unit #1 HMM-30	May 66 -	H19	.8		"
	15Dec66	UH1E	356.0	2	"
WFO-5	15Dec66 -				"
	14Apr67	UH1E	224.4		"

For Second Lieutenant Edward J. FUNCHEON Jr. (b) (6) USMC

COMMAND ATTACHED	Period Assigned	Model A/C	Flight Hours	CV LDGS DAY/NIGHT	Operational Proficiency
Training Command	May 65 -	T34	28.6		NONE
	Oct 66	T28	136.1	6 4	"
		TH-13M	20.9		"
		H34	54.6		"
Sub Unit #1 HMM-30	5Dec66 -				"
	15Dec66	O	0		"
WFO-5	15Dec66 -				"
	14Apr67	UH1E	97.2		"

WFO-5 PAR 1-67A, of 14 APRIL 1967, UH-1E BUNO 152437, PILOT GREENLEESE  
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH GENAV INST 3750.6 SERIES

(b) (6)

CERTIFIED TRUE COPY

ENCLOSURE (23)

STATEMENT OF LANCE CORPORAL (b) (6) USMC, CONCERNING  
VMO-5 AAR 1-67A, 14 APRIL 1967, UH-1E, BUNO 152437, PILOT GREENLEESE

I came in early on that Friday about 0615. I don't recall who was in charge that morning, but whoever it was, told me I was going to fly on a PCM check on UV-13, and to go out and pre-flight it. I went and got some pre-flight cards and went out to the bird. I started the pre-flight and everything looked fine. After it was finished I remembered I had forgotten to take a fuel sample, so I went and got the fuel sample bottle and took a sample, it looked good. Ground Support came out and put 1500 lbs of weights in the aircraft and I strapped them in. I was satisfied now that she was ready to fly so I went in and signed it off. I waited awhile until Lieutenant FUNCHEON came in and signed the Yellow Sheet. I told him that I was going to be the crew chief and he gave me a briefing. We went out to the bird and he started his pre-flight. He pulled a good pre-flight and was ready to strap in. Lieutenant GREENLEESE was not out there yet, so Lieutenant FUNCHEON decided to go ahead and strap in and get everything set before Lieutenant GREENLEESE came out. He started his check list, and everything was set. We sat there a minute or so and Lieutenant GREENLEESE came out. He was in his usual good mood and asked if everything was ready. Lieutenant FUNCHEON said it was and he hopped in and strapped in. We turned up and everything looked good. We taxied out and the tower cleared us to get in a right hand orbit to shoot some auto's and some precision approaches. Lieutenant FUNCHEON was doing fine, but I recall on one of the approaches he dropped the collective too fast and too high and we hit the deck a little hard. Lieutenant GREENLEESE said it was alright so we proceeded to Camp De Luz and shot some approaches to the heli-pad they have there. Lieutenant FUNCHEON was a little nervous but Lieutenant GREENLEESE told him he was doing fine and probably gave him some confidence. We then went to Case Springs and did some RAL's. Lieutenant FUNCHEON was good at them so we didn't stay long. We came back to Margarita Area and some landings on a slope with one skid on a slope and the other one in the air, after that we came in and landed. I ran into the line shack and got the gear for the external weight part of the hop but the weight crew was not ready. We couldn't find anyone to go so Lieutenant GREENLEESE decided to shut down and resume the hop on the next launch. He told me to take out the weights and told me when to be back there. The fuel truck came out and I refueled it. I came in to the line shack and told Ground Support the weights had to be removed. I went out to the board to see who was going to be on the ground crew, I found out then that my section leader told me I couldn't finish the hop because the bird wasn't in my section. They assigned another crew chief and I resumed my regular duties.

(b) (6)

(b) (6)



Lance Corporal (b) (6) has been a member of VM0-5 since October 1966. He was put on Non-Crew Member gunner flight pay in December 1966, then to Non-Crew Member for training and on 1 May 1967 was placed on Crew-Member flight pay. Lance Corporal (b) (6) has a total of 263 hours flight time in the UH-1E. He is considered a credible witness.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

STATEMENT OF CORPORAL (b) (6) USMC CONCERNING VMO-5  
AAR 1-07A, 14 APRIL 1967, UH-1E, BUONO, 152437, PILOT GREENLEESE

I was assigned the regular Crewchief on UV-13. I was assigned the Crewchief after the making of three work sections in the maintenance dept.

The aircraft had only been up a short while for it had a 1:1 lateral beat. (One per revolution vibration. A/B) Upon changing sections Sgt. (b) (6) balanced the stabilizer bar and night crew put it together. I worked off the Q.C. gripes the following morning. There was only two or three. They were not major items just safety wire and small things on the rotor head. This aircraft had a 540-A stabilizer bar, even though it was a 540 rotor system.

After a test hop (During which the aircraft flew satisfactorily) the aircraft was sent back to the line and started flying.

Since I was the crewchief I did almost all the preflighting & dailies (Daily aircraft inspection. AAB). The only time I did not do this was when someone flew it for night flying or early launch in the mornings.

During this time I experienced no difficulty with the aircraft. It flew real smooth and it had no leaks to my knowledge. The aircraft was kept reasonably clean, and as far as I know it had no discrepancies that would have in any way effected the safe operation of the aircraft.

I had not been the crewchief on the aircraft, very long, but I had just begun to know it to the point I felt perfectly safe while flying in the airplane. Even though it is a personal opinion I believed it to be one of the best aircraft in the squadron. I would have went with it anywhere without any misgivings or a second thought.

I never had to add any engine or transmission oil or hydraulic fluid. The rotor head was fairly clean and the collective scissors didn't sling out enough grease to hardly notice. Some aircraft sling it bad enough to make it necessary to wipe the Scissors Assembly after each flight. The aircraft had a new Scissors and Swashplate assembly and all controls were in good shape. The engine performed very reliably and gave me a feeling of security.

I flew the airplane on the 13th (night flying) on a weight hop and did not notice anything out of the ordinary on the flight, or on the postflight and during the securing of the aircraft.

The above statements are my personal opinions, but I feel I knew

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES



the aircraft as well as anyone could have, and am reasonably sure the aircraft was in good shape.

(b) (6)

Corporal (b) (6) has been a member of VMO-5 since September 1966. He was assigned non-crew member flight pay for crew member training in January 1967 and assigned as a crew member in February. He has flown a total of 144.3 hours in the UH-1E. Corporal (b) (6) is a graduate of both the T-53-L-11 Engine class and the UH-1E airframe class at NAMTG, Camp Pendleton. He is considered a credible witness.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

VMO-5 AAR 1-67A, 14 APRIL 1967, UH-1E BUNO 152437, PILOT GREENLEESE

TRANSCRIPTION OF RADIO TRANSMISSIONS BETWEEN LONG BEACH APPROACH CONTROL  
AND UNIFORM VICTOR 13 ON 14 APRIL 1967

LEGEND:

UV-13 - Uniform Victor ONE THREE (UH-1E Bureau Number 152437)

LGB - Long Beach Approach Control

NOTE 1: Times given are all Uniform Time Zone (Local) on 14 April 1967.

NOTE 2: Transmissions between LGB and UV-13 are all in Capital letters  
and other transmissions are all in lower case. In addition,  
Non-Pertinent call signs are in parentheses.

NOTE 3: FAA regulations require five minutes prior to and subsequent to  
pertinent transmissions.

1217U

1218U

1219U

1220U

1221U

1222U

+ 50 SEC UV-13 LONG BEACH APPROACH UNIFORM VICTOR ONE-THREE...  
OVER.

1223U LGB WAS THAT UNIFORM VICTOR ONE-NINER THAT CALLED  
LONG BEACH APPROACH CONTROL...OVER.

UV-13 THIS IS UNIFORM VICTOR ONE-THREE-ER-JUST DEPARTED  
AAH...SAN-SAN-AH...YA...VINCENTE COAST GUARD LIGHT  
HOUSE LIKE TO MAKE A VFR FLIGHT PLAN.

LGB AH...UNIFORM...AH...VICTOR ONE...AH...THREE IS...  
AH...FOR YOUR VFR FLIGHT PLAN CAN YOU CONTACT...  
AH...FLIGHT SERVICE OR...AH...IS IT NECESSARY  
TO FILE THROUGH ME...OVER.

UV-13 ROGER...I TRIED CONTACTING 'EM, BUT COULDN'T  
GET 'EM UP ON THE AIR.

LGB ALLRIGHT...AH...UNIFORM VICTOR...AH...ONE-EH-  
THREE...AH...GO AHEAD WITH YOUR FLIGHT PLAN.

(b) (6) UV-13 ROGER...VFR FLIGHT PLAN UNIFORM VICTOR ONE-  
THREE IS HELICOPTER UH1 ECHO, HUNDRED TEN KNOTS  
TRUE AIR SPEED, PROPOSED DEPARTURE TIME WAS AT...

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH CPMV INST 3750.6 SERIES

ENCLOSURE 24

1224U

AH...AH...WA...ONE-NINER. REQUESTING...WA...  
ONE...EH...POINT OF DEPARTURE WAS SAN VINCENTE  
COAST GUARD LIGHT HOUSE. REQUESTING TERRAIN  
PLUS ONE-THOUSAND VIA DIRECT EL TORO VIA DIRECT  
CAMP PENDLETON. CAMP PENDLETON IS DESTINATION.  
TIME OUT ONE...EH...ONE POINT FIVE AND IT'S TWO  
HOURS FUEL ON BOARD. PILOT'S NAME FUNCHEON, F -  
U, CORRECTION, FOX, UNIFORM, NOVEMBER, CHARLIE,  
HOTEL, ECHO, OSCAR, NOVEMBER AND...EH...AIRCRAFT  
HOME BASE IS CAMP PENDLETON.

LGB UNIFORM VICTOR...AH...ONE-THREE...AH...ROGER...  
AH...AFTER YOUR...EH...ROUTING WAS THAT AN  
ALTITUDE THAT...UH...YOU WERE GOING TO CRUISE AT?  
I MISSED THE ALTITUDE.

UV-13 EH...VFR.

UV-13 ROGER...WE'RE CRUISING VFR.

LGB UNIFORM VICTOR-R ONE NI...THREE (GARBLED) YOU  
ALSO DEPARTED THE...H...LIGHT HOUSE AT ONE-  
NINER, IS THAT CORRECT?

UV-13 THAT'S AFFIRM...AH...ONE-THREE-ONE-NINER.

LGB UNIFORM VICTOR ONE-THREE, ROGER. WE'RE FILING  
YOUR FLIGHT PLAN WITH FLIGHT SERVICE AT THIS  
TIME.

UV-13 ONE-THREE, ROGER. THANK YOU VERY MUCH.

1225U

LGB YOU'RE WELCOME SIR AND...AH...DO YOU NEED...AH...  
TRAFFIC ADVISORIES, OVER?

(7K119) at...ah...Los Alamitos

(LGB) Say again.

(7K119) Marine Jet seven kilo one-one-nine off the  
deck...ah...Los Alamitos.

(LGB) Marine seven kilo one-one-niner, Long Beach  
Departure Control Radar contact traffic between  
twelve and one-o'clock, two miles West bound.

(7K119) one-one-nine, roger.

(LGB) Marine seven kilo one-one-niner, turn right  
heading two-one-zero. Climb and maintain six  
thousand for six minutes after departure.

(7K119) Eh...roger. Turning two-one-zero right and

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES



climb to six.

(LGB) kilo one-one-niner, that's correct. Westbound traffic is clear off to your right rear at this time.

(7K119) Roger, I have 'em.

(LGB) Okey, sir.

LGB AH...M RINE COPTER...EH...UNIFORM VICTOR...EH... ONE-THREE, DID YOU REQUIRE TRAFFIC ADVISORIES, OVER?

UV-13 THIS IS VICTOR ONE-THREE. NO WE'D APPRECIATE IT.

LGB UNIFORM VICTOR ONE-THREE, ROGER. GIVE ME YOUR PRESENT POSITION AND HEADING.

1226U UV-13 PRESENT POSITION IS...AH...ONE-TWO-ZERO RADIAL LOS ANGELES, ONE-EIGHT-ONE-NINER MILES AND HEADING ZERO-EIGHT-ZERO.

(LGB) Marine seven kilo one-one-niner climb and maintain flight level three-three-zero, squawk code two-zero-zero-zero, then contact Los Angeles Center on three-two-two-point four.

(7K119) Eh...roger. Eh...seven kilo one-one-nine's out of six for thirty-eh flight level three-three-zero, ahh, and I'm squaking three/two-zero-zero and going three-two-two-four.

(LGB) That's correct, sir.

LGB UNIFORM...EH...VICTOR...EH...ONE-EH-THREE-EH SQUAWK CODE...EH...ZERO-SIX...EH...ZERO-ZERO NORMAL, IDENT.

UV-13 ONE-THREE, SQUAWKING.

1227U (N1383P) Long Beach Approach Control Apache one-three-eight-three-Papa, over.

(LGB) Apache one-three-eight-three-Papa, Long Beach Approach, go ahead.

(N1383P) One-three-Papa we're si...six DME miles North of the VOR on Victor four-five-nine, for landing Long Beach.

(LGB) ah...roger...ah...plan left traffic runway one-six

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES



left, wind's one-eight-zero degrees at...a...one-zero, contact tower one-one-niner point four to enter the traffic pattern, advise them you have the numbers.

(N1383P) Roger, three Pop.

LGB EH...MARINE UNIFORM VICTOR ONE-THREE, DID YOU IDENT ON-N CODE ZERO-SIX, SIR?

UV-13 VICTOR ONE-THREE, ROGER, SQUAWKING AGAIN.

1228U LGB UNIFORM VICTOR...AH...ONE...EH...THREE...EH... I HAVEN'T PICKED YOU UP ON YOUR IDENT...AH... ARE YOU...AH...A-APPROACHING THE SHORELINE SOUTHEAST BOUND NOW OR ARE YOU EASTBOUND OVER THE WATER?

UV-13 THIS IS VICTOR ONE-THREE OVER HUNTINGTON BEACH AT...AH...TWO-EIGHT. EH...FIVE-THOUSAND...EH... FIVE-HUNDRED. REQUEST FREQUENCY CHANGE.

LGB EH...FREQUENCY CHANGE APPROVED.

UV-13 THANK YOU SIR, OUT!

LGB YOUR WELCOME.

LGB EH...I GOT-CHER IDENT NOW UNIFORM VIC ONE-THREE FOR YOUR OWN INFORMATION.

1229U (N4373L) Long Beach Approach Control Cessna four-three-seven-three Lima.

(LGB) Cessna four-three-seven-three Lima, Long Beach approach Control, over.

(N4373L) Roger, Long Beach, seven-three-Lima at Los International VFR Long Beach, over.

(LGB) four-three-seven-three...eh...Lima right traffic, runway, one-six right, wind's one-eight-zero degrees at one-zero. Contact tower one-two-zero-point five at least five miles from the airport, advise them you have the numbers.

(N4373L) Eh...roger, seven-three Lima.

1230U

1231U (UP11) Long Beach Departure Control, Uniform Papa one-one, off Navy Los Al at three-two, over.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

(LGB) Uniform Papa...eh...one-one Long Beach Departure  
Control...eh, roger.

(LGB) Uniform Papa one-one, you just lifting off the  
right runway, over?

(UP11) This's Papa one-one, that's affirmative.

(LGB) Uniform Papa one-one radar contact, and...ah...  
climb cross Midway intersection, at four-thousand.  
Maintain four-thousand.

(UP11) Papa one-one, roger.

1232U (LGB) Uniform Papa one-one, turn left heading one-two-  
zero.

(UP11) Papa one-one, roger, coming left to one-two-  
zero.

1233U (LGB) Uniform Papa one-one is eight miles Northwest  
of the Midway intersection turn left heading zero-  
niner-zero. Join Victor twenty-three. Resume  
normal navigation.

(UP11) Papa one-one, roger.

I hereby certify that the above is a true transcription of the  
recorded radio transmission between 1217U and 1233U on 14 April 1967.

(b) (6)

SATCS  
Long Beach

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

WEATHER SERVICES DIVISION  
AIRFIELD OPERATIONS DEPARTMENT  
U. S. MARINE CORPS AIR STATION  
EL TORO (SANTA ANA) CALIFORNIA 92709

AIRCRAFT EMERGENCY/ACCIDENT DATA FORM

Prepared by the Weather Services Division, Station Operations Department,  
Marine Corps Air Station, El Toro, Santa Ana, California.

DATE 14 April 1967

AIRCRAFT DATA

1. Place of emergency 068° Approx. 9 1/2 Miles from NZJ Tacan  
accident accident
2. Time of emergency App. 1245U 3. Nature of emergency Crash
4. Pilot's name and rank
5. Pilot's home station and organization VMO-5 SUB-UNIT 1 MCALF CAMP PENDLETON
6. Aircraft type and side number HU1E (HELICOPTER UV-13)

WEATHER DATA

Certified true extract of the official weather records.

1. Place observation taken MCAS EL TORO
2. Time and type of observation RECORD OBSERVATION 1258U
3. Sky (condition and height) 6/10 CUMULUS ESTIMATED HEIGHT OF 2,500 OVERCAST  
LAYER OF CIRUS AT UNKNOWN HEIGHT
4. Visibility 10 Obstruction NONE Precipitation NONE
5. Temperature 64 Dew Point 51 Relative Humidity 63
6. Wind Direction 260° Speed 10 KTS. Character STEADY
7. Recorded Altimeter 30.05 Pressure Altitude +230 Time 1255U
8. Recovery Condition Density Alt.: +380 Specific Humidity: 0.008
9. Was an experienced weather observer in the tower? VISIBILITY ONLY
10. All recorded remarks
11. Forecaster's brief statement of existing conditions See Enclosure (1)

(b) (6)

(b) (6)

ASS'T WEASERO

(Name, rank, service number, and official status)

(b) (6)

CERTIFIED TRUE COPY

ENCLOSURE (27)

VMO-5 AAR 1-67A, of 14 APRIL 1967, UNRE BUONO 152437, PILOT GREENLEESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"



STATEMENT OF WEATHER CONDITIONS THAT PREVAILED AT MCAS EL TORO DURING  
THE PERIOD 1100U 14 APRIL 1967 UNTIL 1300U 14 APRIL 1967:

SYNOPTIC SITUATION: Weak surface trough had passed through the local  
area between 0800U and 1000U followed by a weak  
ridge of high pressure, resulting in moist unstable  
air along the southern coast of California.

GENERAL WEATHER CONDITIONS: Scattered low clouds at an estimated height  
(base) of 2,500 feet at 0958U had increased to broken  
conditions at 1058U with an aircraft report of  
bases at 2,500 feet over MCAS EL TORO at approx.  
1045U, with tops reported by same aircraft at 4,000  
feet. An overcast layer at an estimated 16,000  
feet at 1000U had become an unknown base overcast  
of cirrus (clouds with bases above 20,000'), at  
1058U.  
Visibility through out entire day was unrestricted,  
(greater than 7 miles) with no precipitation record-  
ed throughout the day.  
Surface winds during period in question was from 280  
degrees (in regards to true North) variable to 260  
degrees at 6-10 knots.  
Freezing level estimated 10,000 feet.

CONDITIONS OBSERVED TO THE EAST OF MCAS EL TORO IN VICINITY OF SANTIAGO  
PEAK: Bases of broken to overcast layer estimated at 3,000  
feet. Terrain above 3,000 feet was obscured by clouds.  
Visibility below clouds was better than 7 miles.

THIS STATEMENT IS TRUE TO THE BEST OF MY KNOWLEDGE:

(b) (6)

(b) (6)

WEATHER WATCH OFFICER

ENCLOSURE(1)

VMO-5 AAR 1-67A, of 14 APRIL 1967, UH1E BUNC 152437, PILOT GREENLEESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"



TRANSCRIPTION OF MAY DAY TRANSMISSION BY UH-1E UV-13 (BUNO 152437)  
RECEIVED BY MCAS EL TORO, NAS LOS ALAMITOS AND AIF SAN CLEMENTE ISLAND  
TOWERS AT 1245U, 14 APRIL 1967, ON 340.2 MEGACYCLES. DURATION OF ENTIRE  
TRANSMISSION WAS SIX SECONDS.

May Day, May Day, May Day, Uniform Victor one three (unkey) one four  
miles south (end of transmission)

(b) (6)

CERTIFIED TRUE COPY

VMD-5 AAR 1-67A, 14 APRIL 1967, UH-1E, BUNO 152437, PILOT GREENLEESE  
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

ENCLOSURE (2)

STATEMENT OF LTCOL

(b) (6)

USMC, CONCERNING VMO-5

AAE 1-67A, 14 APRIL 1967, UH-1E, BUONO 152437, PILOT GREENLEESE

On 14 April, I departed Camp Pendleton at 1250 in a UH-1E on an ADMIN hop to MCAS El Toro and MCAF Santa Ana. At 1251, the Camp Pendleton tower advised me that El Toro tower had received a MAYDAY from UV-13. No further information was available. Approximately five minutes later, I contacted El Toro tower who confirmed the original MAYDAY report.

I assumed control as Airborne Search Coordinator and immediately instructed four other HUEYS to search areas, by FM radio. I also requested assistance from MHTG-30 and requested that the Group Commander be notified.

As various helicopters joined in the search, I assigned them sectors of search responsibility. Numerous false civilian reports began drifting in. A coast Guard helicopter was assigned the beach area, as there were considerable indications of a helicopter crash at sea off Huntington Beach.

I attempted to search the local area after learning that UV-13 was only five minutes from his El Toro ETA (1250) at the time of his MAYDAY call. Knowing the check pilot's habits personally, I concentrated the search effort by helicopter because of its better inherent search characteristics, in the Rough Area Landing sites in the mountains to the East of El Toro.

At approximately 1400, I recalled all but the beach search aircraft and landed at MCAF, Santa Ana. After a conference more detailed search sectors were assigned by the Search Coordinator, the Group Commander.

The weather at the time of the MAYDAY and the ensuing 2-4 hours was: Broken to overcast in the Santa Ana-El Toro area, visibility 15-20 miles. The mountaintops to the East were partially obscured by a rather solid overcast. I do not know the actual tops but from the holes in the El Toro area, would estimate them at about 5,000 feet. The bottoms came down to 3500-4000 feet. Another UH-1E and myself actually searched the canyon where the crash was eventually discovered but were unable to get above 4000 feet due to the clouds.

The search was continued with a maximum effort by all participating aircraft until the crash was located, by accident, by the El Toro SAR helicopter on 16 April. Upon being informed of the crash location, I rendezvoused with the SAR helicopter and he directed me to the site. Any landing nearby the crash was impossible, and after several attempts, I finally managed to set down one-half mile away on a ridge at the 5100

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES



foot level. From there I hiked down to the crash where I found all four men dead. This information was then passed to the Group Commander, also airborne at the crash site.

(b) (6)

Lieutenant Colonel (b) (6) was designated a Naval Aviator in April 1947. He has 4592 total hours, 1036 helicopter hours and 232 hours in the UH-1E.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

# RESCUE REPORT

OPNAV FORM 3750-13 (3-63)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6

INSTRUCTIONS: SEE INSTRUCTIONS

OPNAV REPORT FORM 3750-13

1. NAME OF RESCUE VEHICLE <b>Airfield Operations, NAS, El Toro, Calif.</b>		2. DATE OF RESCUE <b>14 April 67</b>	3. DATE OF REPORT <b>16 April 67</b>
4. LOCATION AND NATURE OF RESCUE VEHICLE <b>WRECK, EL TORO (SAR)</b>		5. RESCUE VEHICLE (Type/Model) <b>UH-34D</b>	
6. NUMBER OF PERSONNEL <b>3</b>	7. IN RESCUE VEHICLE OR ON RESCUE TEAM <b>3</b>	8. RESCUEE <b>None</b>	9. RESCUEE TYPE OF WOUND <b>UH-34D</b>
10. TIME SEQUENCE OF EVENTS (Long, Date, Time, Group)		11. WEATHER CONDITIONS AT RESCUE SITE	
12. Report Received <b>1328</b>	13. Report (Tower) <b>Phone (Tower)</b>	14. WATER TEMPERATURE <b>°F</b>	15. AIR TEMPERATURE <b>3 °F</b>
16. Vehicle Reported <b>1330</b>	17. Distance to Scene <b>10 Mile</b>	18. SEA STATE/SEA HEIGHT/FREQUENCY, TIDE/INFORMATION <b>1500' very steep - scattered to overcast clouds at 4700'</b>	
19. Search Requested <b>1340</b>	20. Search Requested <b>Yes</b>		
21. Location of Scene <b>Sighted crash WRE-3 from air</b>			
22. Report Received <b>None</b>	23. What Was Lighted First <b>Wreckage</b>	24. EQUIPMENT ACTUALLY USED DURING RESCUE <b>NONE</b>	
25. Report Received <b>None</b>	26. Subsequently <b>WMD A/C at scene</b>		
27. Location (If different from Item 11) <b>NONE</b>			

18. DIFFICULTIES ENCOUNTERED (List all difficulties and effect on time, nature of rescue attempt, i.e., ALERTING PERIOD, SEARCH/LOCATING, RETRIEVING, POST-RETRIEVAL)

Third day of search for WRE-3 - Alerted to find a reported light A/C crash 1 1/2 miles South of Santiago PX. During search wreckage of Marine 152437 discovered and reported. No survivors. WMD A/C on scene.

PERSONNEL REQUIRING RESCUE			GIVE REASON FOR RESCUE	FACTORS COMPLICATING RESCUE ATTEMPT (Physical condition, language of equipment, strategy, etc.)
NAME-LAST	FIRST	INITIAL		

19. REMARKS (Training of rescue team or crew, communication equipment/technique, medical equipment/technique, rescue vehicle)

NONE

(b) (6)

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20. ATTACH ENCLOSURES: Narratives of search, location and retrieving - Survivor's statements

21. NAME AND TITLE OF SUBMITTING OFFICIAL

22. NAME AND TITLE OF SUBMITTING OFFICIAL  
**(b) (6) OIC SAR**

23. NAME AND TITLE OF SUBMITTING OFFICIAL

**(b) (6) LtCol, Airfield Operations Officer**

SIGNATURE OF SUBMITTING OFFICIAL

(b) (6)

SIGNATURE OF SUBMITTING OFFICIAL

WMD-5 AAR 1-67A, of 14 APRIL 1967, UH1E BUNO 152437, PILOT GREENLEESE  
"SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

ENCLOSURE (5)



# AIRCRAFT OPERATIONS AND MAINTENANCE SUMMARY

UV-13 BUNO 152437

1 OCTOBER 66 - 14 APRIL 67

## 1. FLIGHT TIME BY MONTH:

October	55.0	HRS	February	41.6	HRS
November	56.9	HRS	March	61.2	HRS
December	25.1	HRS	April (thru 14th)	36.4	HRS
January	44.5	HRS			

## 2. FLIGHT TIME 30 DAYS PRECEDING ACCIDENT

### MARCH

13 Down; 2nd ODD  
24 5.8  
25 5.6  
26 4.4  
27 5.9  
28 3.8  
29 3.9

### APRIL

5 5.7  
6 4.6  
7 7.4  
8 1.7  
10 4.4  
11 1.4  
12 Down; 50 HOUR CHECK  
13 7.6  
14 3.6

## 3. DISCREPANCIES AND CORRECTIONS BY TYPE

DISCREPANCY	DATE	CORRECTIVE ACTION	SOURCE DOCUMENT
1:1 Vibration	7Oct66	Reset pitch change links	GJ1-6280-884
1:1 "	7Oct66	Red blade swept 1 1/2 turns fit	GJ1-6280-877
1:1 "	11Oct66	Reset pitch change links	GJ1-6284-884
1:1 "	17Nov66	Torqued friction collet	GJ1-6321-875
1:1 "	1Dec66	Replaced friction collet	GJ1-6335-966 (Cancelled)
1:1 "	7Dec66	Removed & retorqued friction collet	GJ1-6342-823
1:1 "	3Jan67	Vibration within limits	GJ4-7003-461
1:1 "	5Jan67	Tightened friction collet	GJ4-7005-508
1:1 "	12Jan67	Reshimmed swashplate Repacked short shaft	GJ4-7012-588
1:1 "	19Jan67	Changed mixing lever	GJ4-7019-689
1:1 "	20Jan67	3 degrees red blade up	GJ4-7020-713
1:1 "	2Feb67	Retorqued friction collet	GJ4-7033-957
1:1 "	7Feb67	Retorqued friction collet	GJ4-7038-036
1:1 "	7Feb67	Retorqued friction collet	GJ4-7038-047

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES  
VMO-5 AAR 1-671. of 14 APRIL 1967, UH-1E BUNO 152437, PILOT GREENLEESE

(b) (6)

ENCLOSURE (31)

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<u>DISCREPANCY</u>	<u>DATE</u>	<u>CORRECTIVE ACTION</u>	<u>SOURCE DOCUMENT</u>
1:1 Vibration	10Feb67	Retorqued friction collet	GJ4-7041-133
1:1 "	1Mar67	Retorqued friction collet	GJ4-7060-068
1:1 "	17Mar67	Changed swashplate assy	A/C Log Book
1:1 "	28Mar67	Retorqued friction collet	GJ4-7087-548
1:1 "	29Mar67	Retorqued friction collet	GJ4-7088-563
1:1 "	30Mar67	Torqued friction collet	GJ4-7089-575
1:2 Vibration	10Feb67	Retorqued friction collet	GJ4-7041-134
Lateral beat	28Mar67	Retorqued friction collet	GJ4-7087-515
Medium Frequency Vibration	11Jan67	Tracked tail rotor	Yellow Sheet
High Frequency Vibration	11Jan67	Changed hub and balanced tail rotor	GJ4-7011-737
High Frequency Vibration	23Jan67	Changed hub and balanced tail rotor	GJ4-7023-737
Insufficient Collective Friction	15Feb67	Increased built in Friction	GJ4-7046-260
Pin Broken in Droop Stop of Red Blade	24Oct66	Replaced pin	Yellow Sheet
Pivot Pin for Droop Stop is Broken	22Nov66	Replaced pin	Yellow Sheet
Pin on Co-Pilots Door Needs Re-placing	21Dec66	Pin on Co-Pilots door well within limits	Yellow Sheet
Pilots Door Rattles	12Apr67	Adjusted Pilots door	GJ4-7103-089
Loud Noise Heard in Tail Section with Corresponding Jerk in Tail Rotors Check Possibility of Loose Brass Fouling Rudder push Rods	29Nov67	Cleaned and checked tail rotor servo for cracks and distortion, Tail Rotor and Cables	Yellow Sheet
Check Intake Screen for grass	10Jan67	Complied with MRC #2	Yellow Sheet
6900 RPM Twice	21Dec66	Within Limits	Yellow Sheet

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES VMO-5 AAR 1-67A, of 14 APRIL 1967, UH-1E BUONO 152437, PILOT GREENLEESE

<u>DISCREPANCY</u>	<u>DATE</u>	<u>CORRECTIVE ACTION</u>	<u>SOURCE DOCUMENT</u>
Tendency to Overspeed when Reducing Collec- -tive	23Dec66	Rerigged Governor Control	GJ4-6357-264
Governor RPM Holds at + 100 Vice + 50	27Dec66	Rerigged Governor Control Beep Checked by Subsequent Pilot; Checked OK	GJ4-6361-264 GJ4-7096-712
Max Beep 6600	6Apr67	Adjusted Timing Screw 1/16 Turn	GJ4-7012-587
Max Power 0.7% High	12Jan67	Recharged Battery; this Could Account for Abnormal Hot Start	Yellow Sheet
690° on Start- Battery Voltage Dropped to 12V	70Oct66	Within Limits	Yellow Sheet
680° For 2 Seconds on Start	22Nov66	Changed Starting Fuel Nozzles and Ignitors	GJ1-6334-933
Could Not Get Engine to Start Without Exceeding Temperature Limits; Crew Chief Reports Little or No Sound From Ignitors	28Nov66	Removed and Replaced Washers	GJ4-7046-261
Control Rod Hitting Mixing Levers	15Feb67	Greased Tail Rotor	GJ4-7047-304
Oil Slung on Tail Rotor	16Feb67	No Leakage During 5 Minute Turnup	Yellow Sheet
Transmission Oil Leak Found on Post Flight	4Nov66	Tightened Oil Line	GJ4-7031-894
Transmission Oil Leak	31Jan67	Tightened Screw on Cable	Yellow Sheet
Pilots Harness Only Locks Occa- sionally	3Feb67	Repaired	Yellow Sheet
Pilots Harness Lock Inoper- ative	21Feb67		

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES  
VMO-5 AAR 1-67A, of 14 APRIL 1967, UN-1E BUNO 152437, PILOT GREENLEESE



<u>DISCREPANCY</u>	<u>DATE</u>	<u>CORRECTIVE ACTION</u>	<u>SOURCE DOCUMENT</u>
RPM Warning Light comes on when Battery Turned on	5Jan67	Removed and Replaced RPM Warning Light Control Box	GJ4-7005-509
High RPM Warning Light Inoperative	17Dec66	Adjusted RPM Warning Box	GJ4-6351-134
A/C Generator Out	25Mar67	Broken Wire to Terminal Fixed	GJ4-7084-483
Starboard Generator Failed	28Feb67	Repaired Broken Wire	GJ4-7059-021
Force Trim Out: Pilots Button Sticks	11Oct66	Repaired Pilots Force Trim Button	GJ1-6284-927
Force Trim Release Button	18Oct66	Replaced Pilots Force Trim Button	GJ1-6291-959
Complete Loss of Force Trim	31Oct66	Replaced Broken Wire on CoPilots Force Trim	GJ1-6303-942
Force Trim Inoperative	19Feb67	Repaired CoPilots Switch	GJ4-7050-421
Hoist Works With Hoist Power Switch Off	1Oct66	Ground Checked Good	Yellow Sheet
Cyclic Stick Switch Bad	21Feb67	Adjusted Switch On CoPilots Cyclic Stick	GJ4-7052-475
Cyclic Stick Switch Bad	7Mar67	Adjusted Indent Screw CoPilots Side Found Bad Bracket on Transmitter - safe for Flight (Parts not Avail.)	GJ4-7066-768
Fluctuating Fuel Pressure Gage	26Oct66	Jet Cal of Thermocouple and Indicator OK	Yellow Sheet
Fluctuating EGT	29Nov66		Yellow Sheet
Landing Light Will Not Extend	7Dec66	Replaced-Checks OK	Yellow Sheet
Pilots Altimeter Off	15Nov66	Reset Altimeter	Yellow Sheet

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES VMO-5 AAR 1-67A, of 14 APRIL 1967, UH-1E BUNO 152437, PILOT GREENLEESE

<u>DISCREPANCY</u>	<u>DATE</u>	<u>CORRECTIVE ACTION</u>	<u>SOURCE DOCUMENT</u>
Pilots Altimeter Need Adjusting	7Dec66	Reset Altimeter	Yellow Sheet
Altimeter Needs Resetting	17Dec66	Replaced and Reset Altimeter	GJ4-6351-147
Airspeed Indi- cator Slow to In- dicate on Take Off	27Dec66	Blew Out Pitot System	GJ4-6361-265
Weak TX UHF	10Oct66	Ground Check Good	Yellow Sheet
UHF Out	6Oct66	Removed and Replaced UHF	GJ1-6279-867
Intermittent	7Oct66	Removed and Replaced UHF Could Not Duplicate	GJ1-6280-877
Intermittent Noise in UHF	21Dec66	Discrepancy on Limitations Sheet	GJ4-6355-182
UHF ADF Home 180° Out	23Dec66	APA-25 Removed	Yellow Sheet
UHF Unsatis- factory	4Jan67	Removed and Replaced UHF	GJ4-7004-493
UHF Inoper- ative	6Feb67	Removed and Replaced UHF	GJ4-7037-018
UHF TX Out	9Mar67	Removed and Replaced UHF	GJ4-7068-911
TACAN Inoper- ative	21Dec66	Removed TACAN	GJ1-6356-182
TACAN Inopera- tive	2Feb67	Removed and Replaced TACAN	GJ4-7033-956
TACAN Inopera- tive	9Feb67	Removed and Replaced TACAN	GJ4-7041-139
TACAN Azimuth Out	7Mar67	Checked Good On Channel 55 and with URM-101	GJ4-7066-767
TACAN Azimuth 90° Off	10Mar67	Removed and Replaced TACAN	GJ4-7069-931
HF Antenna Mount Cracked-Starboard Side	22Nov66	Replaced Mount	Yellow Sheet

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES  
VMO-5, AAR 1-67A, of 14 APRIL 1967, UH-1E BUNO 152437, PILOT GREENLERSE

<u>DISCREPANCY</u>	<u>DATE</u>	<u>CORRECTIVE ACTION</u>	<u>SOURCE DOCUMENT</u>
FM Radio Readable but Scratchy	30Dec66	Adjusted Squelch	Yellow Sheet
FM No Receive TX OK	10Feb67	Checks OK	Yellow Sheet

4. AIRFRAME CHANGES NOT INCORPORATED IN BUNO 152437 AS OF 14 APRIL 1967

AFC #7-ROUTINE - Fixed forward firing suppression kit, installation of  
COMPLIANCE: Organizational level and above. When directed by  
type commander.

AFC #11-ROUTINE - Electrical; Replacement of electrical connector on  
aft engine firewall, lower right side  
COMPLIANCE: Service activities/NLT next PAR

AFC #21-URGENT - Rotating Control System: Improve servcibility of  
collective mast friction  
COMPLIANCE: Service activities/NLT next PAR

AFC #22-URGENT - Cargo Door, installation of retaining straps to  
secure cargo doors in open position  
COMPLIANCE: Service activities/NLT next PAR

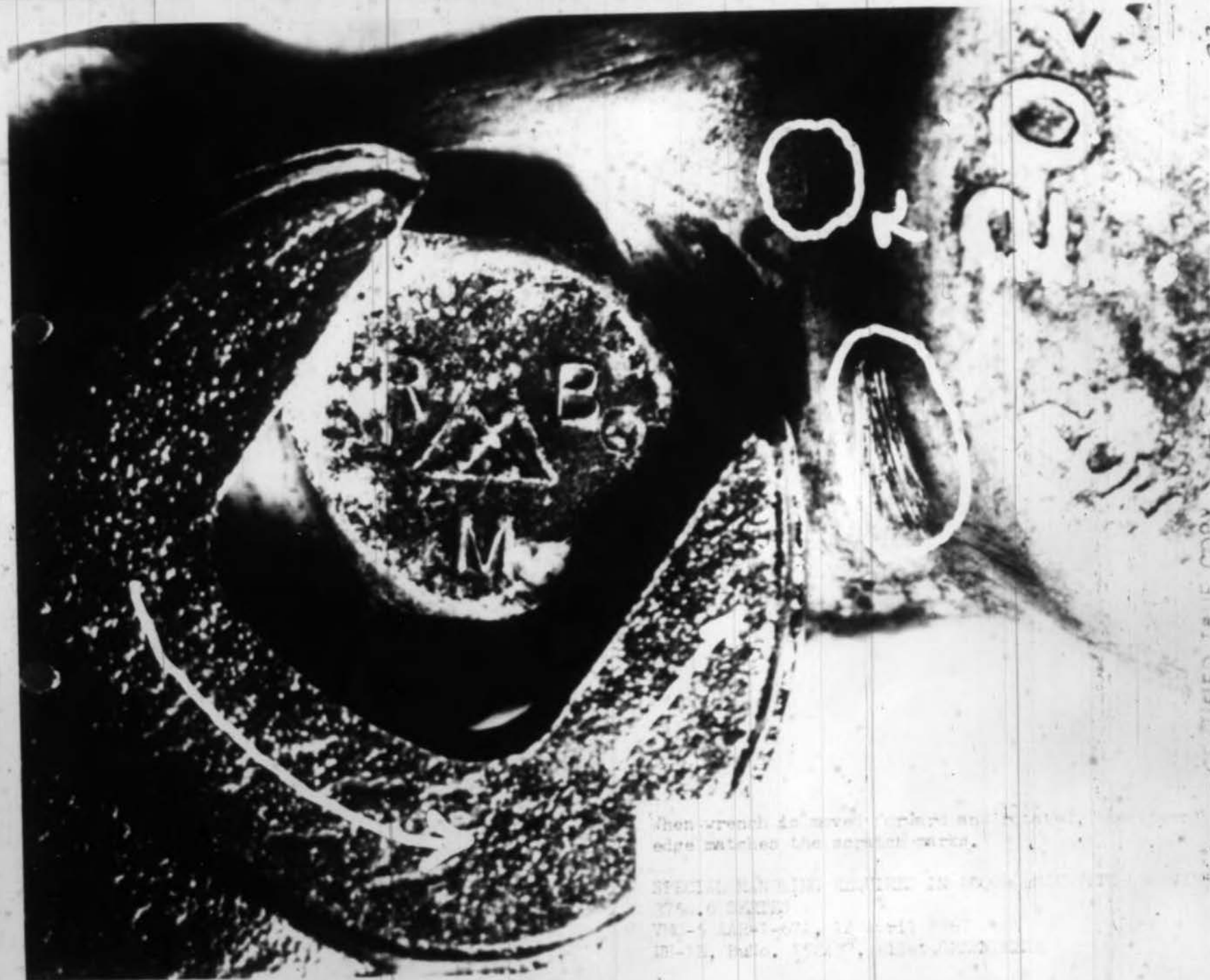
AFC #27-URGENT - Rotor bearing dust seal deflector  
COMPLIANCE: Service activities

AFC #29-URGENT - Armament provisions - Modification of modification  
by installation of provisions to adapt internal  
armament provisions to emerson TAT-10LE, 7.62MM  
Gun Turret.  
COMPLIANCE: Service activities/NLT next PAR

AFC #34-URGENT - Wiring the engine chip detector and check out of  
(Part B) the chip detector warning system.  
COMPLIANCE: Service activities/NLT next calendar inspection.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES  
VMO-5 AAR 1-67A, of 14 APRIL 1967, UH-1E BUNO 152437, PILOT GREENLEESE





When wrench is moved forward and rotated, the  
edge matches the scratch marks.

SPECIAL AGENT IN CHARGE  
FBI - NEW YORK  
FBI - NEW YORK  
FBI - NEW YORK

STATEMENT OF MAJOR (b) (6) USMC, MAINTENANCE OFFICER  
VMO-5, CONCERNING VMO-5 AAR 1-67A, 14 APRIL 1967, UH-1E, BUNO 152437,  
PILOT GREENLEESE

There are two types of self-locking nuts used on this aircraft.  
They are:

- a. All metal
- b. Fiber insert

The fiber insert nut is of two types; one which locks by friction only, and the other which uses a cotter pin to aid in the locking procedure.

Policy for use and reuse of self-locking nuts is as follows:

- a. On critical areas of the aircraft such as flight controls, rotating components, engine and fuel control linkage, nuts are used only one time, then discarded.
- b. In other areas, self-locking nuts may be reused if they meet the following requirements:
  - (1) Visual examination shows no cracks, stripping of threads, or excessive rounding of edges where the wrench is applied.
  - (2) No less than one full thread of locking is effective beyond the finger-tight condition as the nut is hand-threaded onto the bolt.

This policy has been in effect and monitored by Quality Control since I became Aircraft Maintenance Officer on 1 August 1966. Since then no known deviations have been allowed, with the exception of the incorporation of Airframe Change #3 which calls for a new self-locking nut in throttle linkage. These nuts are not yet available in sufficient quantity. Prior to my arrival, the possibility of the use of self-locking nuts in a manner other than prescribed by my policy existed, but no specific occurrence can be pinned down.

The policy for torquing of nuts and bolts is to use torque values as prescribed in the Handbook of Maintenance Instruction for the UH-1E. If no torque is prescribed, a standard value for the particular nut and bolt in question is taken from NAVAIR 02B-15AB-2 which contains a standard torque value table for all nuts and bolts. This publication has been used because it is the most readily available of the various publications which list general or standard torque values. The UH-1E maintenance manuals do not list a specific torque for the tail rotor crosshead bolt. NAVAIR 02B-15AB-2 gives a value of 70-95 inch pounds

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

ENCLOSURE (33)

which has been used in this squadron up to now. NAVWEPS 17-1-108 concerns the care, cleaning, and callibration of torque wrenches and is now available.

For purposes of standardization this manual will be used for torque values from now on. It lists a value of 50-70 inch pounds for the tail rotor crosshead bolt. Policy dictates torqueing to the higher value. Because of the differences in standard torque values listed in various publications, confusion can and does often exist. Correspondence will be initiated with Naval Air Systems Command concerning clarification of this problem.

(b) (6)

Major (b) (6) has 2746.6 total hours and 1316.1 hours in the UH-1E. He is an instructor with WMO-5.

Certified  
a true copy



STATEMENT OF SECOND LIEUTENANT (b) (6) USMC, FLIGHT  
EQUIPMENT OFFICER VMO-5, CONCERNING VMO-5 AAR 1-67A, 14 APRIL 1967, UH-1E,  
BUNO 152437, PILOT GREENLEESE

The aviators equipment section of VMO-5, of which I am the Officer in Charge, presently maintains ten (10) NB-8 back pack type parachutes for use in the UH-1E aircraft.

In the first group of UH-1E aircraft received by the Marine Corps, the back seat cushion for both the pilot's and co-pilot's seat could easily be removed and this back chute worn. However, with the advent of the armored seat, the back chute puts the pilot sitting too far forward in the seat. The side armor next to the door on both sides makes an egress from the aircraft with the back type chute a virtual impossibility.

At the time of the accident of UV-13, 1stLt GREENLEESE was the Officer in Charge of the aviators equipment section. The records of this section show that the ten (10) NB-8 type parachutes were maintained and available for issue on request.

(b) (6)

Second Lieutenant (b) (6) has 5325.8 total hours and 913.4 hours in the UH-1E. He is an instructor with VMO-5.

Certified  
a true copy

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAV INST 3750.6 SERIES

ENCLOSURE (3)

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REQ # 177  
 LISTING OF ALL HI OIL-DRAGS  
 WITH ALIT TIME CODES FI, FE, IF, F  
 OR WITH MATL FILTERS CODE C

AF [REDACTED] F50 T 4 A F 2 F2 336 92 A1 32 34  
 543 133 62 4  
 T53L11 LE09607 2  
 5000 EXPLOSION FOLLOWED  
 BY DECELERATION OF ACFT & SWERVE OF NOSE TO PORT. NR  
 RPM AT 5900 STARTING BACK UP AFTER COLLECTIVE LOWER-  
 ED. HEARD LOW RPM AUDIO WARNING SOUND. WITNESSES OB-  
 SERVED FIRE & SMOKE FROM ENGINE. AUTOROTATIVE LANDING  
 ATTEMPTED RESULTING IN CONTROLLED COLLISION WITH  
 GROUND. INVS REVL'D ENG FAILURE ATTRIBUTED TO FATIGUE  
 FAILURE OF 2ND STAGE COMPRESSOR ROTOR BLADES. CAUSE  
 OF FATIGUE FAILURE DUE TO BLOCKAGE OF AIR INLET FROM  
 GRASS BECOMING ENTWINED ON THE INLET AIR VANE ASSY.  
 DESIGN CONTRIB- ENG SUSCEPTIBLE TO FOD.

FG [REDACTED] F50 T 4 F G 2 F4 474 31 3  
 1-170-160-01  
 T53L9  
 DURING T/O RUN  
 PILOT WAS NOTIFIED THAT SMOKE WAS COMING FROM ENGINE  
 COMPARTMENT & ABORTED T/O. INVS REVL'D THE NICKLE  
 SOLDER BRAZING ON THE MAIN FUEL MANIFOLD CRACKED,  
 ALLOWING RAW FUEL UNDER HIGH PRESS TO BE SPRAYED INTO  
 ENG COMPARTMENT.

AF [REDACTED] F53 T 3 A F 2 F1 36 3 3

FG [REDACTED] E60 V 3 F G 2 P1 411 3 3

124041-600380 75

NO DATA

#2 HYD SYSTEM PRESS  
 LINE BURST IN FLT. PLT AUTOROT TO FINAL LAN. NOSE  
 BURST AT SWEDGE ON 45DEG ANGLE FTG ON HYD PRESS OUT-  
 LET 2ND STAGE HYD PUMP.

VNO-5 AAR-67A, OF 14 APRIL 1967, UNITE BUHO 152437, PILOT GREENLEESE  
 SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

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60131212

70409102

6022309

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TCZCNASC810CSLB 770  
RTTU JAW RUWJMUA4379 1301749-UUUU--RUCILSA.  
ZNR UUUUU

R 101749Z MAY 67  
FM COMNAVAIRPAC  
TO RUWJDEA/MAROBSEON FIVE  
INFO RUCIHOA/CMC  
RUHHFMA/CG FMFPAC  
RUWJBRB/CG THIRD MAW  
RUWJTPA/MARHELTRAGRU THREE ZERO  
RUCILSA/NAVAVNSAFECEN ←

BT  
UNCLAS  
VMO-5 AAR 1-67A EXTENSION REQUEST  
A. YOUR 092105Z MAY 67

1. TEN WORKING DAY EXTENSION GRANTED AS REQ BY REF A.  
BT

COG RECORDS

8/0/67  
MAY  
101749Z



R 042040Z MAY 67

FM ARADMAC CORPUS CHRISTI TEX  
TO RUWMLA/MARHEDMAINFROM THREE ZERO MCAF SANTA ANA CALIF  
RUEDBHA/NAVAIRSYS COMHQ WASHINGTON DC  
RUWJMUA/COMNAVAIRPAC NAS NORTH ISLAND SAN DIEGO CALIF  
RUCILMA/COMNAVAIRLANT USNAS NORFOLK VA  
RUCILSA/NAVAVNSAFECEN USNAS NORFOLK VA  
RUWJMUA/NAVAIRSYS COMREPPAC NAS NORTH ISLAND SAN DIEGO CALIF  
RUCLMHA/NAVAIRSYS COMREPPNCLA USNAS PENSACOLA FLA  
RUHLBP/CG FMFPAC HONOLULU HAWAII  
RUCINVA/CG FMFLANT USNAS NORFOLK VA  
RUWJBRA/CG THIRD MAW MCAF EL TORO SANTA ANA CALIF  
RUWMLA/MARHELTRAGRU THREE ZERO MCAF SANTA ANA CALIF  
RUWJNWA/MAROBSON FIVE MCAF CAMP PENDLETON CALIF  
RUCLPEA/USABAAR FT RUCKER ALA  
RUEOHRA/NATSF PHILADELPHIA PA  
BT

UNCLAS SAVAE-Q 05-1050 SUBJ: UH-1E AIRCRAFT  
BUNO 152437, PRIORITY DIR.

A. REF BUWEPs INST 4732.6, THE FOLLOWING PRELIMINARY REPORT  
OF TEARDOWN ANALYSIS OF COMPONENTS FROM SUBJECT AIRCRAFT, NAVAIRSYS  
COMREPPAC CONTROL NO. 2409-67, IS SUBMITTED:

- B. ENGINE: NEGATIVE, OPERATING AT IMPACT.
- C. TRANSMISSION: NEGATIVE
- D. INPUT QUILL (TRANSMISSION): NEGATIVE
- E. MAST AND SWASHPLATE: NEGATIVE
- F. MAIN ROTOR HEAD: NEGATIVE

PAGE 2 RUWTUBA0059 UNCLAS

- G. 42 DEGREE GEAR BOX: NEGATIVE
- H. 90 DEGREE GEAR BOX: NEGATIVE
- I. TAIL ROTOR DRIVE SHAFT: NEGATIVE

J. TAIL ROTOR BLADE AND HUB ASSY: IT WAS EVIDENT THAT THE  
TAIL ROTOR BLADES STRUCK THE VERTICAL FIM AND TAIL ROTOR DRIVE SHAFT  
BETWEEN THE 42 DEGREE AND 90 DEGREE GEAR BOXES. THE TAIL ROTOR HUB  
POUNDED THE STATIC STOP CAUSING THE TAIL ROTOR HUB NUT THREADS TO FAIL IN  
SHEAR.

K. TAIL ROTOR PITCH CHANGE LINKS AND CROSSHEAD ASSY: EXAMI-  
NATION REVEALED ONE BOLT P/N AN174H15A AND NUT P/N MS21045L4 WAS  
MISSING FROM THE CROSSHEAD ASSY P/N 204-011-711-1. MICROSCOPIC  
EXAMINATION OF THE BOLT HOLE IN THE CROSSHEAD ASSY AND TAIL ROTOR  
SLIDER P/N 204-010-720-3 REVEALED MARKS MADE BY THE THREADED SECTION  
OF THE BOLT. SOOT AND ASH DEPOSITS NOTED IN THE BOLT HOLE INDICATE  
THE BOLT WAS MISSING AT THE TIME OF THE POST CRASH FIRE. THE BOLT  
P/N WAS 1304-19D WHICH CONNECTS THE WHITE BLADE PITCH CHANGE LINK  
ROD END TO THE WHITE BLADE GRIP HORN FAILED FROM BENDING OVERSTRESS.

L. FUEL CONTROL AND OVERSPEED GOVERNOR: TEARDOWN OF THE FUEL  
CONTROL AND OVERSPEED GOVERNOR REVEALED THAT THE FLYWEIGHT BASE  
ASSY P/N 77091 AND FLYWEIGHT AND SAPPHIRE PIN ASSY P/N 75993, IN

PAGE 3 RUWTUBA0059 UNCLAS

THE OVERSPEED GOVERNOR HAD FAILED. LABORATORY METALLURGICAL ANALYSIS  
OF THE FAILED PARTS IS STILL PENDING. COMPLETE LABORATORY ANALYSIS  
WILL BE NOTED IN THE DIR WHICH WILL FOLLOW THIS REPORT.

BT

156/67

ACTION MYA

41-14-67  
VMO-5

042040Z

NNNNZCZCNASC372CZCSLB414  
PTTU JAW RUCLMHA0586 1172218-0000--RUCILSA.

ZNR UUUUU

P R 272218Z APR 67

FM NAVAIRSYSCOMREP PNCL

TO RUWPSL/AVSCOM STLOUIS

RUWTUBA/ARADMAC CORPC

INFO RUEDBHB/NASC HQ

RUWJTPA/MARHEDMAINIRON THREE ZERO

RUWJMUA/COMNAVAIRPAC

RUCILMA/COMNAVAIRLANT

RUCILSA/NAVALSAFCEN

RUWJMUA/NASCREPPAC

RUHHFMA/FMPAC

RUCINNB/FMLANT

RUWJBRB/THIRD MAW

RUWJTPA/MARHETRAGRU THREE ZERO

RUWJDFA/MAROBSSON FIVE

RUCADM/USABAAR

RUWTJVA/NAS CORPC

BT

UNCLAS

PRI DIR ON T53-L-11 ENGINE SER LE89582 AND COMPONENT AS REQUIRED;  
REQUEST FOR:

(A) NASCREPPAC 270128Z APR 67 NOTAL

(B) MARHEDMAINIRON THREE ZERO 192246Z APR 67 NOTAL

(C) NASCREPPAC CONTROL NR 2409-67

(D) FONECON MR BAKER REP NASCREPPAC & REP THIS ACTIVITY 27 APR 67

1. REQUEST PRI DIR ON SUBJ ENG AND SELECTED COMPONENTS FROM  
ENGINE AND ACFT UH-1E BUONO 152437 AS REQUIRED TO COMPLETE ACCIDENT  
REPORT. ACFT COLLIDED WITH GROUND RESULTING IN FATALITIES. REQUEST  
EXPEDITE INVESTIGATION PREM TIME AUTHORIZED AS REQUESTED. FURTHER  
REQUEST ADVISE ALL CONCERNED RESULTS AND REFER TO REF (C) ON ALL  
SUBSEQUENT RELATIVE CORRESPONDENCE.

BT

372/67

COS MYM

APR

272218Z

152437  
4-14-67

NNNNTKNQPASC223A663  
PTTU JAW RUWJDFA2388 1170232-UUUU--RUCILSA. 223/67

ZNR UUUUU  
P R 270232Z APR 67  
FM MAROBSRON FIVE  
TO RUWJMUA/COMNAVAIRPAC  
INFO RUCIHOA/CMC  
RUHHFMA/CG FMFPAC  
RUWJBRB/CG THIRD MAW  
RUWJTPA/MARHELTRAGRU THREE ZERO  
RUCILSA/NAVAVNSAFCEN

Cog Records

BT  
UNCLAS  
CMC FOR CODE ARP  
VMO-5 AAR 1-67A EXTENSION REQUEST  
A. OPNAVINST P3750.6E  
B. MAROBSRON FIVE 170653Z APR 67  
1. IAW REF A REG SIX WORKING DAY EXTENSION ON AAR SUBMISSION ON  
ACCIDENT REPORTED REF B. WRECKAGE RECOVERY DELAYED UNTIL 23 APRIL  
DUE INACCESSIBLE CRASH SITE AND ADVERSE WEATHER.

APR 67  
270232Z



# MESSAGE DRAFT

5010 4462 (Rev 2/58)

CLASSIFICATION  
UNCLASSIFIED

FROM: NAVAL AVIATION SAFETY CENTER (b)(6) MIL 1967 (b)(6)  
DEPT. USN A.I.

ACTION

MAROBSON FIVE

V PRECEDENCE V

INFO

	Mall	
	Night	
	Message	
X	Radio	X
	Priority	
	Op. Immed.	
	Emar.	
	Flash	

CNO /MCAS EL TORO  
NAVAIRSYSCOMHQ  
CMC  
CG FMFPAC  
CG THIRD MAW  
COMNAVAIRPAC  
COMELEVEN  
MARHELTRAGRU THIRTY  
MCAF SANTA ANA  
MCB CAMP PENDLETON

TEXT

UNCLAS E F T O 152437

UH-1E BUWO 151885 ACCIDENT

1. CDR (b)(6), USN, (b)(6), CLRD TOP SECRET WILL ARRIVE MCAS EL TORO FIRST AVAILABLE TRANSPORTATION TO CONDUCT NAVAVNSAFECEN INVESTIGATION OF SUBJECT ACCIDENT.

2. INSTRUCTIONS CONTAINED IN OPNAVINST P3750.6E, PAGE 19, PARA 30.B, AND PAGE 25, PARA 39A (REMOVAL OF WRECKAGE) APPLY.

REFERENCE MESSAGE

TRANSMIT BY  
RADIO

CLASS OF REP.

CWO

FOR COMNAV OFFICE

DATE/TIME GROUP

192147Z

NNNN QZRPAGOV  
YZCSLA686  
PTTE JAW RUWJDFA1463 1870653-EEEE--RUCILSA.  
ZNY EEEEE  
P R 170653Z APR 67  
FM MAROBSRON FIVE  
TO RUENAAA/CNO  
RUCILSA/NAVAVNSAFCE  
INFO RUHLHL/CINCPACFLT  
RUWJMUA/COMNAVAIRPAC  
RUCIHOA/CMC  
RUHHFMA/CG FMFPAC  
RUEDBHB/COMNAVAIRSYS COMHQ  
RUCIJFA/BUPERS  
RUWJHEA/COMELEVEN  
RUCINVA/CG FMFLANT  
RUMHAW/CG FIRST MAW  
RUCINPA/CG SECOND MAW  
RUWJBRB/CG THIRD MAW  
RUCADM/USABAAR  
RUCILMA/COMNAVAIRLANT  
RUWJTPA/MARHELTAGRU THREE ZERO  
BT  
UNCLAS E F T O FOR OFFICIAL USE ONLY

#234/67  
PUPP  
AAR

PAGE TWO RUWJDFA1463 UNCLAS E F T O

CMC FOR CODE AAP

SUPPLEMENTARY MESSAGE REPORT NO 2 AIRCRAFT ACCIDENT

A. QP JAVINST P3750.6E

B. MAROBSRON FIVE 150349Z APR 67 NOTAL

C. MAROBSRON FIVE 152230Z APR 67

1. UH-1E 152437 MAROBSRON FIVE 1-67A WILLIAM ERNEST GREENLEESE

1STLT (b)(6) USMC PREVIOUSLY REPORTED IN REFS B AND C AS  
AIRCRAFT MISSING UH-1E 151885 MAROBSRON FIVE NO MISHAP SERIAL NO 2NDLT  
EDWARD JOSEPH FUNCHEON, JR. (b)(6) USMC

2. COAST GUARD STATION PT VICENTE CALIFORNIA DIRECT MCAS EL

TORO DIRECT MCALF CAMP PENDLETON, VFR, ETE 1 PLUS 15

3. ALPHA

4. ATTEMPTED FORCED LANDING

5. AIRCRAFT WAS ON SCHEDULED PQM CHECK HOP FROM MCALF PENDLETON  
WITH 1STLT GREENLEESE AS INSTRUCTOR PILOT AND 2NDLT FUNCHEON AS PILOT  
BEING CHECKED. AIRCRAFT DEPARTED PT VICENTE FOR EL TORO AND CAMP  
PENDLETON ON SECOND LEG OF FLIGHT AT 141219U. INCOMPLETE MAYDAY  
CALL RECEIVED BY EL TORO TOWER AT 141245U WITH  
AIRCRAFT REPORTING 14 MILES SOUTH OF (BROKEN TRANSMISSION).

PAGE THREE RUWJDFA1463 UNCLAS E F T O

CRASH IN SUSPECTED IFR CONDITIONS WHILE ATTEMPTING FORCED LANDING.

POINT OF IMPACT AT 4400 FOOT LEVEL ON STEEP SLOPE IN SANTA ANA

MOUNTAINS 368 DEG 9.5 NM OF EL TORO TACAN. AIRCRAFT

APPARENTLY IMPACTED FLAT, TURNED ON SIDE AND BURNED. ALL FOUR CREW  
MEMBERS REMAINED IN SEATS AND SUSTAINED ALPHA INJURY.

6. EL TORO WEATHER 2500 BROKEN HIGH OVERCAST VIS 10 TEMP 64

DEW PT 51 WIND 260 DEG 10 KTS.

7. UNKNOWN.

8. UNKNOWN.

9. UNKNOWN.

10. UNKNOWN.

11. NONE.

12. NEGATIVE PROPERTY DAMAGE. RECOVERY ATTEMPTS OF AIRCRAFT  
AND REMAINS CONTINUING.

BT

Supp # 2

APR

1706533



NNNNHSCNASC177CZCSLB711  
RTTE JAW RUWJDFA1372 1052230-EEEE--RUCILSA:  
ZNY EEEEE  
R 152230Z APR 67  
FM MAROBSON FIVE  
TO RUENAAA/CNO  
RUCILSA/NAVAVNSAFCE  
INFO RUHLHL/CINCPACFLT  
RUWJMUA/COMNAVAIRPAC  
RUCINOA/CMC  
RUHHFMA/CG FMFPAC  
RUEDBHB/COMNAVAIRSYSCOM HQ  
RUCIJFA/SUPERS  
RUWJHEA/COMELEVEN  
RUCINVA/CG FMFLANT  
RUMHAW/CG FIRST MAW  
RUCINND/CG SECOND MAW  
RUWJBRB/CG THIRD MAW  
RUCADM/USABAAR  
RUCILMA/COMNAVAIRLANT  
RUWJTPA/MARHETRAGRU THREE ZERO  
BT  
UNCLAS E F T O

# 177/67

PUPP  
AAR

PAGE TWO RUWJDFA1372 UNCLAS  
CMC FOR CODE AAP  
SUPPLEMENTARY MESSAGE REPORT OF AIRCRAFT MISSING  
A. OPNAV INST P3750.6E  
B. MAROBSON FIVE 150349Z APR 67 (NOTAL) 152437  
1. UH-1E 151025 MAROBSON FIVE NO MISHAP SERIAL NO. 2NDLT EDWARD JOSEPH  
FUNCHEON JR. (b)(6) USMCR.  
2. COAST GUARD STATION VICENTE POINT, CALIFORNIA DIRECT EL TORO  
DIRECT CAMP PENDLETON, VFR, 0 PLUS 26.  
3. A/C MISSING  
4. UNKNOWN  
5. FLIGHT PLAN FILED AIRBORNE AT 142022Z THROUGH LONG BEACH APPROACH  
CONTROL. DEPARTURE TIME VICENTE POINT GIVEN AS 142019Z. ESTIMATED  
TIME ENROUTE 1 PLUS 15 FUEL ABOARD 2 PLUS 00. INCOMPLETE MAYDAY  
RECEIVED BY EL TORO TOWER AT 142045Z WITH AIRCRAFT REPORTING  
14 MILES SOUTH OF (BROKEN TRANSMISSION). LAST KNOWN POSITION  
APPROX 7 MILES SOUTHEAST LONG BEACH VORTAC OVER WATER 2030.  
6. EL TORO WEATHER 2500 BROKEN HIGH OVERCAST VIS 10 TEMP 64 DEW  
PT 51 WIND 260 DEG 10 KNOTS WATER TEMP 56.  
7. UNKNOWN  
8. NOT APPLICABLE  
9. NOT APPLICABLE

PAGE THREE RUWJDFA1372 UNCLAS  
10. UNKNOWN  
11. UNKNOWN  
12. AERIAL AND SURFACE SEARCH CONTINUING.. NEGATIVE THUS FAR  
BT

Supp #1

AAR

152230Z



NNNNONASC DE COMM NR 867/15  
SLB508  
PTTU JAW RUWJDFA1331 1050349-UUUU--RUCILSA.  
ZNR UUUUU  
P 150349Z APR 67  
FM MAROBSROV FIVE  
TO RUENAAA/CNO  
RUCILSA/NAVAVNSAFCEN  
RUWJMUA/COMNAVAIRPAC  
INFO RUHLHL/CINCPACFLT  
RUCIHOA/CMC  
RUHHFMA/CG FMFPAC  
RUEDBHB/COMNAVAIRSYSCOM  
RUJIFA/BUPERS  
RUWJHEA/COMELEVEN  
RUJINVA/CG FMPLANT  
RUWJBRB/CG THIRD MAW  
RUCADM/CG USABAAR  
RUCILMA/COMNAVAIRLANT  
RUWJTPA/MARHELTRAGRU THREE ZERO  
BT  
UNCLAS  
CMC FOR CODE AAP

# 067/67

PRELIM AAR

PAGE TWO RUWJDFA1331 UNCLAS  
PRELIMINARY MESSAGE JEPOT OF AIRCRAFT MISSING  
A. OPNAV INST P3750.6E  
1. UH-1E 151885 VMO-5 152437  
2. 142045Z APR 67 FROM COAST GUARD STATION VICENTE PT CALIF TO  
ICAS EL TORO  
3. PQM CHECK HOP  
4. UNKNOWN  
5. MISSING AIRCRAFT. INCOMPLETE MAYDAY RECEIVED BY EL TORO  
TOWER 142045Z APR 67 WITH AIRCRAFT REPORTING 14 MILES  
SOUTH OF (BROKEN TRANSMISSION). LAST KNOWN POSITION APPROX 7 MI SOUTH  
EAST LONG BEACH VORTAC OVER WATER AT 142030Z APR 67.  
6. ELWARD JOSEPH FUNCHEON JR. 2/LT (b)(6) USMC (b)(6) ACTIVE UNKNOWN  
7. WILLIAM ERNEST GREENLEESE 1/LT (b)(6) USMC (b)(6) ACTIVE - PILOT  
UNKNOWN HAROLD ELIHU PLUM CAPT (b)(6) USMC (b)(6) ACTIVE UNKNOWN  
RICHARD DANIEL MILLANE CPL (b)(6) USMC ACTIVE UNKNOWN  
8. N/A

PAGE THREE RUWJDFA1331 UNCLAS  
9. NONE  
AERIAL AND SURFACE SEARCH BEING CONDUCTED UNTIL SUNSET WILL  
CONTINUE FIRST LIGHT  
BT

APC

150349

4-14-67

UH-1E 151885

VMO-5

NNNNHSCNASC 706CZCSLB310  
RTTU ZYY RUWMHFA0947 1652322-UUUU--RUCILSA.

ZNR UUUUU ZFD RUWMHFA

R 142251Z JUN 67

FM NAVPGSCOL MONTEREY

TO RUCILSA/NAVAVNSAFECEN NORVA

RUWJBRB/CG 3RD MAW EL TORO

RUWTUBA/ARADMAC CORPUS CHRISTI

INFO RUWJDFA/VMO-5 CAMP PENDLETON

NAVY GRNC

BT

UNCLAS

UH-1E WRECKAGE FOR AVIATION SAFETY SCHOOL

A. VMO-5 AAR 1-67A UH-1E BUINO 152437

1. FOR NAVAVNSAFECEN. REQUEST RELEASE COMPONENTS OF REF A MISHAP TO AVIATION SAFETY PROGRAM NAVPGSCOL FOR CLASS USE.

2. FOR CG 3RD MAW. UPON RELEASE, REQUEST AIRLIFT STRUCTURAL COMPONENTS FROM CAMP PENDLETON TO NALF, MONTEREY.

3. FOR ARADMAC. UPON RELEASE AND COMPLETION OF DIR, REQUEST AIRSHIP DYNAMIC COMPONENTS TO NALF, MONTEREY, ATTN AVIATION SAFETY PROGRAM.

BT

706/67

ACTION A9I

500  
142251Z

NNNNZCZCNASC699A327

RTTE JAW RUWJMUA8758 1651828-EEEE--RUCILSA.

ZNY EEEEE

R 141828Z JUN 67

FM NAVAIRSYSCOMREPAC

TO RUWJDFA/MAROBSSRON FIVE

RUCILMA/NAVAIRSYSCOMREP PNCLA

INFO RUEDBHB/NAVAIRSYSCOMHQ

ZEN1/COMNAVAIRPAC

RUCILMA/COMNAVAIRLANT

RUCILSA/NAVAVNSAFECEN

RUEDHRA/NAVAIRTECHSERVFAC

RUCINVA/CG FMFANT

RUHHFMA/CG FMFPAC

RUMHAW/CG FIRSTMAW

RUCINPA/CG SECOND MAW

RUWJBRB/CG THIRD MAW

RUMHAW/MAG ONE SIX

RUCINMA/MAG TWO SIX

RUWJTPA/MAG THREE ZERO

RUMHAW/MAT THREE SIX

RUWJABA/NAVAVSAFOFF NORTON AFB

RUCLEPA/USABAR FORT RUCKER

699/67

Cog MOM

PAGE TWO RUWJMUA8758 UNCLAS E F T O

RUWTJVA/NAS CORPC

RUWTUBA/ARADMAC CORPC

BT

UNCLAS E F T O

T53-L11 ENG S/N LE-1000 FAILURE

A. VMO-5: 082311Z JUN 67 PASEP

B. COMNAVAIRPAC/BWFRPAC INST 4730.8A

1. VMO-5: REQ FWD REF A ENG TO SUPO CORPUS CHRISTI. MARK CONTAINER AND DOCUMENTS FOR PRIORITY DIR IAW REF B. ADCON SHIPPING MODE AND TCN OR B/L NRS. REFER NAVAIRSYSCOMREPAC CONTROL NR 3397-67.

2. NAVAIRSYSCOMREP PNCLA: REQ ARRANGE ENGRG ANAL SUBJ ENG S/N LE-1000 IAW REF B. ADCON RESULTS. REFER ABOVE CONTROL NR ALL FUTURE RELATED CORRES.

BT

JUN  
141828Z